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Foundry Pig Iron Smelted in Electric Furnaces

Operations of the Noble Electric Steel Co. at Heroult, Cal., Which Have Proven Successful After Many Trials

For about six years it has been known to the iron and steel trade that attempts were being made at Heroult, in Shasta county, California, to produce pig iron in the Heroult electric furnace directly from the ore. During this period, however, many conflicting reports have been in circulation, and published descriptions of the Noble Electric Steel Co.'s plant have entered so largely into the theory and history of the processes used, that practical men have come to regard the enterprise merely as a large and costly experiment.

From the facts now obtainable, this plant appears to have passed the experimental stage and to be established as a commercial success. Without, therefore, going into the record of the numerous trials and failures which preceded the system now being used, the following will take up present practice.

In the first place the firm name of the company is a misnomer. What it produces is a pig iron, adapted especially to the use of custom foundries in the Pacific and mountain states. The principal demand from these foundries is for a soft, high-silicon iron which is a good scrap carrier and can be easily machined when cast.

The Furnaces

This is produced in two electric furnaces of the long and narrow type, each having four electrodes delta-connected and suspended between five charging stacks. The shell of each furnace is steel, rectangular in shape and lined with standard furnace brick. The lower part is battered four ways and corresponds to the hearth of a blast furnace while the upper section represents the bosh or melting zone. The charging stacks, each 18 feet high, are also battered, to prevent the charge from hanging. Between the stacks, the top of the furnace is arched over, and through the centers of these arches the electrodes penetrate vertically into the charge. Each is 12 inches in diameter and 48 inches long, made of Acheson graphite. At the upper end of each is a tapered male threaded nipple, while the lower end has a corresponding socket with a female thread. As the electrode is fed into the charge, a new one is fastened to it, making a continuous conductor. The electrode holders are water-cooled cylindrical stuffing boxes.

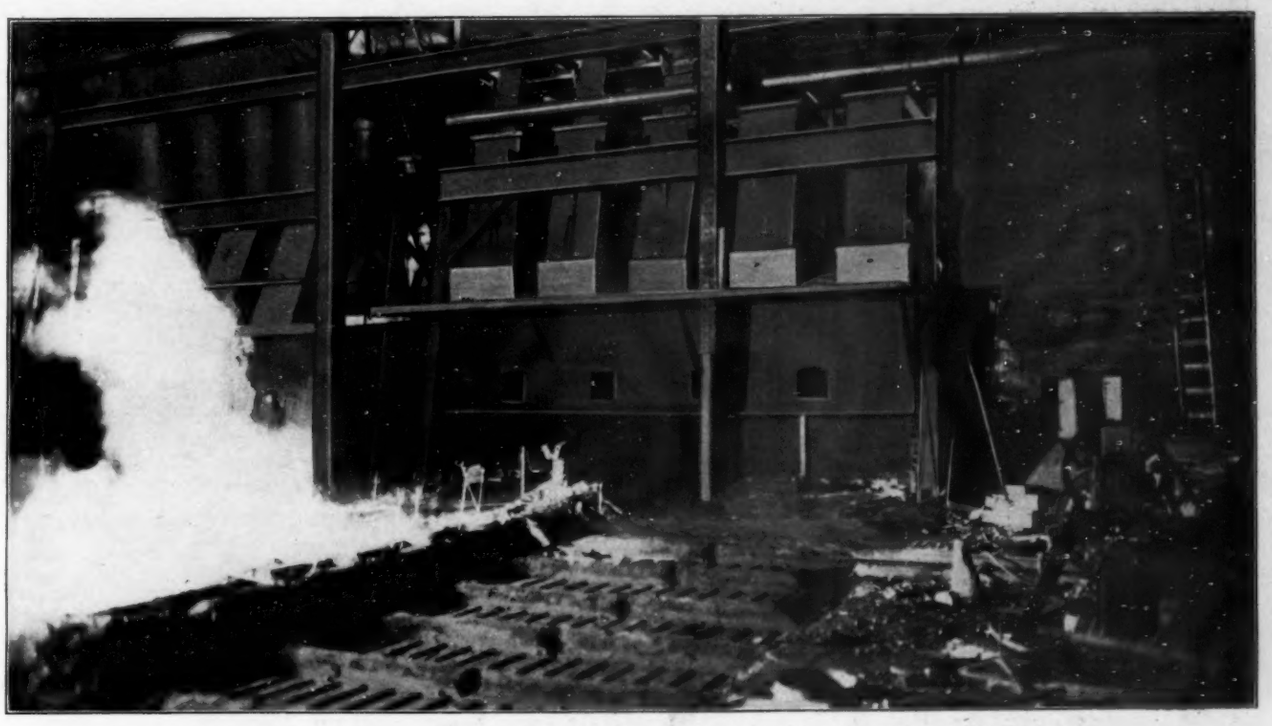


FIG. 1—ARRANGEMENT OF ELECTRIC FURNACES, SHOWING ONE UNIT BEING TAPPED

98 per cent copper, packed with compressed graphite. This packing offers no more resistance to the current than the electrode and forms a sleeve for the latter to slide in, when raised or lowered, without breaking the electrical contact.

The Ore Used

The ore used is a magnetite obtained from open pit workings nearby, which runs high in iron and very low in sulphur and phosphorus. The flux, also found in the vicinity, is an exceptionally pure limestone, mainly calcite, and some barren quartz is added. For fuel, charcoal is used. This comes from the company's own retorts.

The stock is charged into the five stacks on the proportional basis of

500 pounds of magnetite,
135 to 150 pounds of charcoal,
3½ pounds of burned lime,
12½ pounds of quartz.

In charging, the ore cars are run on the mixing floor, which is at the same level as the charging floor. Cars with charcoal come into the lower part of the building and are hoisted on an electrically-operated elevator to the mixing floor. Lime and quartz for flux are also brought in in cars, and each material is dumped into bins. The mixing is done in the car, which is run on a platform scale. The charge is placed in layers, the proportions depending upon the tests made in the laboratory by the chemist. The small charging unit mentioned, while it entails extra labor on the feed floor, has the advantage of mixing the ore, charcoal and flux as intimately as if the materials were bedded, and uniformity in the charge is very important. In this type of furnace the ore is reduced to a much greater extent by actual contact with the carbon than by the action of the carbon monoxide in the stack gases, analyses of which have shown 4.2 to 8.6 per cent carbon dioxide, 56.2 carbon monoxide, some hydro-carbons and small quantities of free oxygen and hydrogen. Thus it will be seen that the ratio of CO to CO_2 is very high, with consequent heavy charcoal consumption.

The use of coke in place of charcoal has been considered. On this point the manager and metallurgist of the plant states:

"The 72-hour metallurgical coke such as I have tried offers two objections: First, its electrical conductivity is so good that much of the current passes between the electrodes in the upper part of the furnace. The smelting zone is thereby raised and the furnace runs hot on top, with attendant melting of the arches, and cold at the bottom.

"Second: This coke, because of its density and high crushing strain, does not break down like charcoal as the burden descends; hence, less surfaces of carbon are exposed to be oxidized by the ore and there is less intimate mixture of the two. Reduction of the ore takes place more slowly, the silicon in the iron is lowered, the power consumption per ton increases, and thus the efficiency of the furnace is reduced. However, by adopting certain precautions in crushing the stock and feeding same into the furnace I have operated on a mixture of 60 per cent coke and 40 per cent charcoal with a very fair degree of furnace efficiency and the grade of the iron was kept up to No. 2 foundry.

"The possibilities of operating electric iron furnaces with coke instead of charcoal seems to me to offer a very interesting and necessary field for investigation. At present successful operation of electric iron furnaces depends, among other things, on an abundant and fairly cheap supply of charcoal. This generally limits their field of activity to well-timbered regions, which are usually isolated and where freight rates are high. I believe that many of our coals which make a very poor metallurgical coke for blast furnace use on account of their low crushing strain might be found to make a satisfactory fuel for electric furnace use."

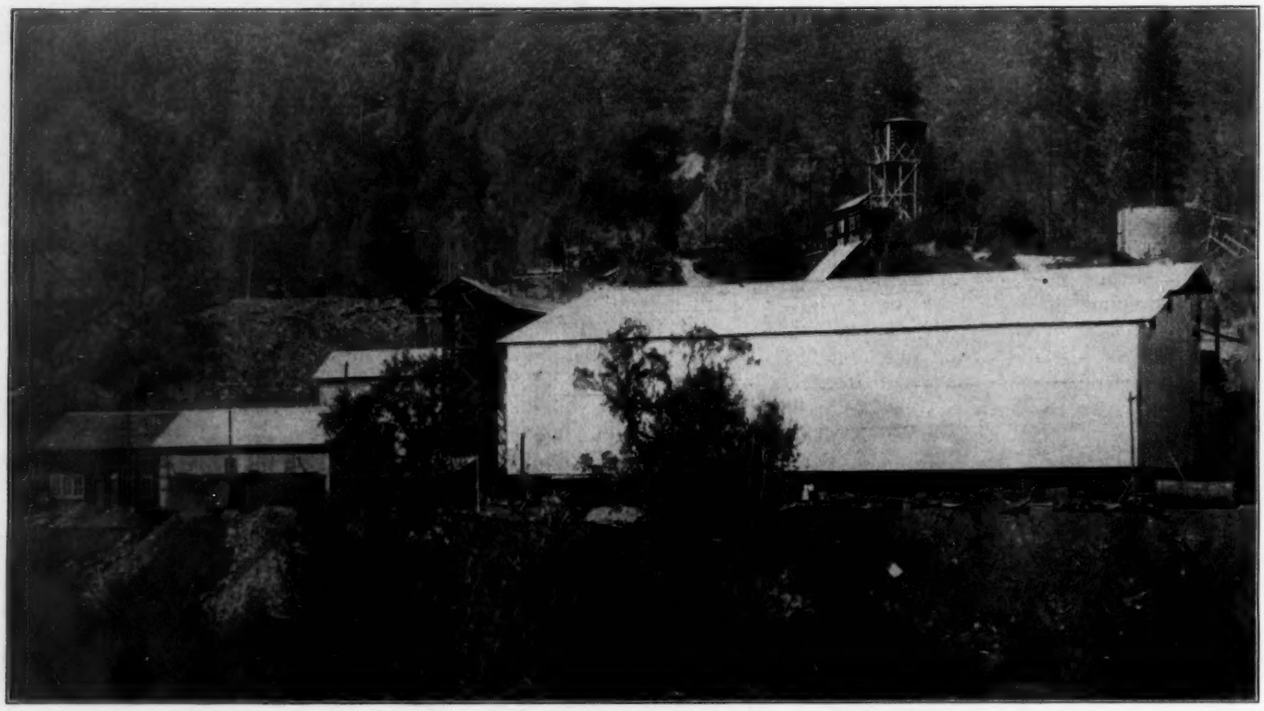


FIG. 2—FURNACE BUILDING WITH GRAVITY TRAM FROM FLUX CRUSHING PLANT

High Silicon Iron

From the fact that the trade supplied from this plant demands a high silicon iron, the problem has arisen not only of making pig iron, but also economically producing a grade which will run 2 or 3 per cent silicon. The manager expresses this as follows:

"When a blast furnace works 'off', it ordinarily means only a slight concession in price to get rid of the low grade iron, while with us here if iron runs under 1 per cent silicon it means a large concession in price to dispose of it.

Ore Low in Silicon

"The ore, as it comes from the mine, will often run for weeks at a time as low as 2½ per cent SiO_2, and from 67 to 68 per cent Fe; so that to make pig iron which will run from 2 to 3 per cent Si, it is necessary to augment the silica in the ore by the addition of barren quartz. The requisite amount of lime or limestone is added so as to give theoretically a slag running about 47 per cent SiO_2. In calculating the charcoal for the burden we assume all the carbon burns to CO, as we find it necessary any way (for reasons previously given) to carry an excess of charcoal in order to make high silicon iron. Thus to make 2.75 silicon iron the theoretical quantity of charcoal (containing 85 per cent fixed carbon) necessary is 35 per cent of the pig, whereas there is actually used about 40 per cent. Inasmuch as any necessary change in the burden is distributed over five stacks, the furnace responds very rapidly and practically permits of the silicon in the iron to be controlled within a limit of 0.5 per cent."

The iron is tapped three times a day into sand molds. A sample is taken from each bed from a pig, 10 inches long, cast for the purpose, and drillings from the several test pigs are ground together for analysis.

The electric ratings of No. 6 and No. 7 furnaces are 2,000 and 3,000 kilowatts, respectively. Current for operating them is supplied by the Northern California Power Co.'s hydro-electric system. It comes in over three-phase, 60-cycle, 60,000-volt transmission lines and is stepped-down in the company's own substation. Here are six Westinghouse, 1,500-kilowatt, oil-immersed and water-cooled lowering transformers wound for a voltage ratio of 38,100 to 2,200 volts, Y-connected on the high tension side. The high tension leads pass through a General Electric oil switch by which the furnace load is cut in or out.

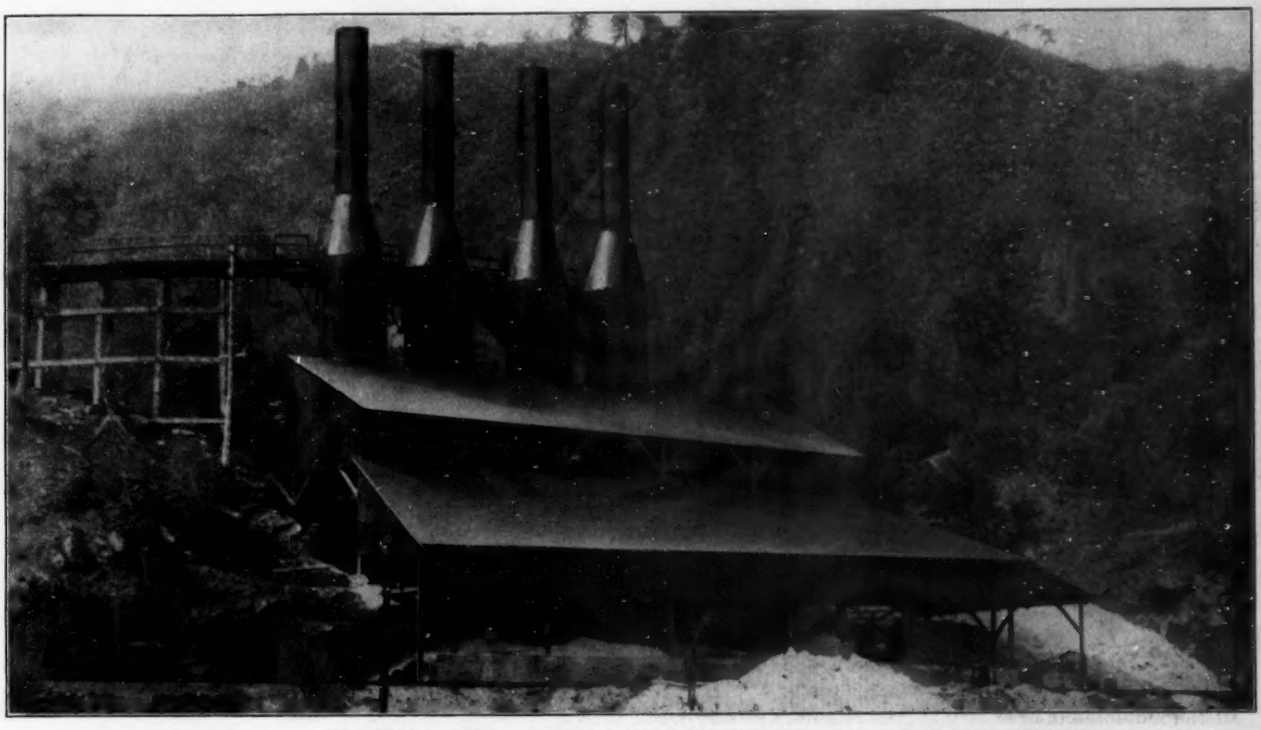


FIG. 3—LIME KILNS OPERATED IN CONNECTION WITH THE ELECTRIC FURNACES

The following slag analyses will indicate the extent of silica variation:

SiO_2 Per cent.	Al_2O_3 Per cent.	FeO Per cent.	CaO Per cent.	MgO Per cent.
54.00	29.70	1.30	12.98	1.17
50.20	28.60	2.40	16.03	2.36
46.13	27.20	0.65	23.10	3.31

"Ordinarily, slags containing more than 50 per cent SiO_2 are too viscous to run well, but our slags are fluid up to 54 per cent SiO_2. This may be due to the high alumina ratio. As we only make from 125 to 140 pounds of slag per ton of pig, it is found more economical to permit a small percentage of the iron to escape in the slag than to attempt to reduce it. The depth of the green color in the slag also serves as a rough indication for the furnace men as to whether the carbon ratio of the burden is becoming too high or too low.

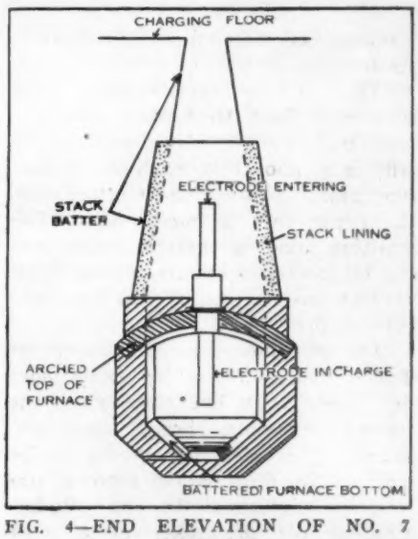


FIG. 4—END ELEVATION OF NO. 7 FURNACE

The three 750-kilovolt-ampere furnace service transformers, which are close up to the rear side of the furnace, furnish three-phase currents at from 40 to 80 volts. They are specially designed General Electric transformers, oil-immersed and water-cooled and capable of standing an overload of 25 per cent. On the 2,200-volt primary side are brought out eight current taps for voltage regulation. These are taken to an oil-immersed individual solenoid-operated contactor panel, which is connected with the switchboard, to give 15 steps for voltage regulation.

The connections from each of the transformers to the electrodes on the low-tension side consist of eight pieces of ⅜ x 8-inch copper bus-bar connected in delta from the three transform-

ers to the four electrodes. An electrode lasts in continuous operation about 30 days. Occasionally one electrode breaks in the furnace. At first the detection of a break appeared to be a serious matter, but an extremely simple means of finding this out was evolved. A bar is driven into the furnace opposite the electrode, through one of the several peep holes, and at the same time the electrode is tapped on top with a hammer. The man on the bar simply listens for the tapping. The tapping is then done on the bar and the man on top listens. A break may be accurately located in this manner.

Electric control is through a switchboard, there being a panel for each furnace. As the current and power comprising a 125-volt direct current generator, direct-connected to a 10-horsepower induction motor. This set has a small panel board mounting a circuit breaker, ammeter voltmeter, and two single pole knife switches. The transformers, switches and control were supplied by the General Electric Co. In the event that line voltage should fall, or for any other cause the direct current supply should become deranged, there is a National Storage Battery Co.'s set, having a capacity of 7½ kilowatts, which can be instantly switched in, and thus prevent the furnace from cutting out in the case of low voltage.

In operation, the electric furnace is so different from the ordinary blast furnace, and there are so many unheard-of or unlooked-for effects, that the old experienced furnace man, who knows by sound or appearance or by any of the mysterious signs which he alone understands, the condition of the furnace or the condition of the charge, would be helpless should he attempt to operate the electric arc furnace. So far as sound or visible manifestation is concerned, one might stand beside it and not know whether it were cold or whether the bath were ready to discharge its six tons of molten metal, over which was being dissipated in the terrific heat of 4,200 degrees Fahr. the 3,000-horsepower of electric energy. There is scarcely a sound. On the charging floor it is different, as considerable heat escapes there, and while a charge is being loaded into the furnace there is ample manifestation of the internal activity.

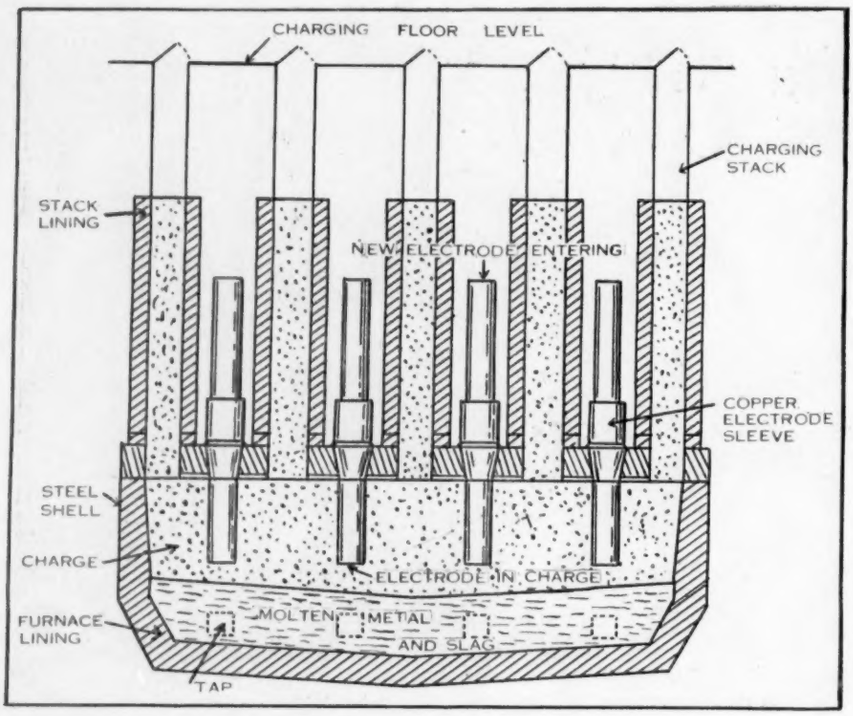


FIG. 5—SIDE ELEVATION OF NO. 7 FURNACE

The furnace operates in a partial vacuum; that is, no air is allowed to get inside. The electric arc travels between the electrodes, which are buried in the charge, and supplies the heat for smelting. The oxygen of the iron ore combines with the carbon, forming not only carbon dioxide, but also carbon monoxide, and many of the higher series of hydro-carbons. In fact, the furnace may be tapped at certain points and draw off one or the other of these gases.

In operation, the furnace is continuous. After a period of eight hours the hearth contains a full bath of molten metal, and this is therefore tapped three times each day. Charging is done at regular intervals, and the current is not shut-off at any time. When the time for tapping arrives, the pig molds having been built-up in the interim after the previous charge, the furnaceman simply drives a bar through the tap hole and the iron comes out. The iron with most of the impurities, particularly the silicon content, comes first. This is manifested by the brilliant, but short-lived, display of sparks; then comes a steady flow of iron. After the iron has all run out, the slag follows, and is diverted into the proper channel. In 15 minutes the heat is over, the tap hole is plugged, and a new bath is in progress of smelting.

Changes in Electrical Conditions

During the period of smelting the change in electrical conditions is interesting. At the beginning of the charge the power factor is almost unity. This gradually lowers as smelting continues, until with a full bath of metal a power factor of about 65 per cent is reached. If coke is used in place of charcoal, or if a mixture is employed, a different set of power factor conditions exists. By studying these conditions, it is possible to know the exact condition of the charge by looking at the meters. The load is, of course, a function of the voltage, and with half voltage the load will drop one-quarter. The consumption of the electrodes constitutes a heavy charge against production. It is offset, however, by the much greater life of the furnace lining than in the case with gas or oil fuel furnaces.

In relation to the product of the plant, the management gives the following information:

"Our system of grading is some-

factor in each phase must be under observation at all times during operation, separate meters are installed in each phase. The requirements for one panel are three ammeters, three voltmeters, three wattmeters, three power factor meters and three recording wattmeters. These are mounted across the panel in rows of three each. Under the first four sets named are three hand wheels to control the voltage variation, under these three switches, which control the entire load, and still under these are the recording wattmeters.

Operating Voltage Control

For operating the voltage control and the main circuit breakers, there is a 7½-kilowatt motor-generator set,

what like that used in grading southern iron, except that we grade entirely by silicon content as the sulphur and phosphorus run uniformly under 0.04 per cent when we operate on charcoal alone.

"The system adopted by the American Foundrymen's Association for sampling carload lots is followed, and we sell if necessary on a guaranteed silicon content within 0.25 per cent limits. Our grade card follows:

	Per Cent	Silicon
No. 1 Silvery	4.5	5.0
No. 2 Silvery	4.0	4.5
No. 1 Soft	3.5	4.0
No. 2 Soft	3.0	3.5
No. 1 Foundry high	2.75	3.00
No. 1 Foundry low	2.50	2.75
No. 2 Foundry high	2.25	2.50
No. 2 Foundry low	2.00	2.25
No. 3 Foundry high	1.75	2.00
No. 3 Foundry low	1.50	1.75
No. 4 Foundry high	1.25	1.50
No. 4 Foundry low	1.00	1.25

"We generally limit our production to the four foundry grades.

"Since it is made with charcoal one would not expect the fracture of electric furnace iron to be as coarse as that of coke iron of equal silicon content, but the fracture of our iron is much finer and more uniform than that of charcoal blast furnace iron of the same grade. A very noticeable characteristic is the homogeneity of the fracture and the almost entire absence of segregation and hard spots. It is also distinguished by its toughness, so that we have to cast it with very deep notches.

"This iron has been used for making almost every article which comes within the province of the foundryman, and we have yet to hear a complaint where it has been used intelligently. The softer irons have already won a reputation for themselves as softeners and scrap carriers. Some analyses taken at random of carload lots of high, medium and low grade iron will illustrate how constant all the other metalloids are except the silicon.

Analysis of Pig Iron Shipped

"Analyses on a 200-ton lot shipped to a foundry for making steel castings and sold on a guarantee of from 2.75 to 3 per cent silicon and a maximum of 0.04 per cent sulphur and 0.04 per cent of phosphorus, average:

	Per cent
Silicon	2.88
Combined carbon	0.09
Graphitic carbon	3.38
Sulphur	0.028
Phosphorus	0.031

"Analysis of a 100-ton lot shipped for general foundry purposes, silicon guaranteed from 2.25 to 2.50 per cent:

	Per cent
Silicon	2.42
Combined carbon	0.27
Graphitic carbon	2.94
Sulphur	0.036
Phosphorus	0.023

Analysis of a 100-ton lot shipped to stove works to be mixed with high phosphorus iron for stove castings, sold on a guarantee of from 1.75 to 2.00 per cent silicon and 0.04 per cent maximum of phosphorus:

	Per cent
Silicon	1.78
Combined carbon	0.60
Graphitic carbon	2.86
Sulphur	0.028
Phosphorus	0.030

The Plant

The plant consists of the following six main buildings: The boiler house, where steam for various uses is generated; the charcoal ovens or retorts; the refinery, where the by-products from the manufacture of charcoal are distilled and collected; the sub-station, which contains the lowering transformers, receiving current from the power transmission lines and delivering current at 2,400 volts for all uses about the plant; the building which contains the electric furnaces, and which is the principal point of interest in the plant; and finally, the lime-kilns.

The boiler house is a corrugated iron building, containing two Westinghouse-Church-Kerr return tube boilers, each rated at 100 horsepower. These boilers use crude oil fuel, and have the regular complement of burners and oil feed pumps. There is also a Goulds three-throw plunger pump, driven by a 30-horsepower Westinghouse induction motor. This is installed for fire purposes and to augment the regular gravity service supply.

The Furnace Building

The furnace building has a heavy steel frame, and is covered with galvanized corrugated iron. It is rectangular in shape, 120 feet long and 75 feet wide, and has a height of about 60 feet. Its position is parallel to and adjoining the railroad track. The 24-inch gage track system of the plant has a track running through the building, with the necessary switches, turntables, etc. The building is in two sections or bays, divided by a line of columns. The southerly of these is the pouring floor, on which the pigs are cast. Throughout this bay is operated a 50-foot Northern Engineering Co. traveling crane. This has two hoists, one of 20 and the other of five tons capacity. An Electric Controller & Mfg. Co. lifting magnet is used in picking up the pigs. This will lift about 1,000 pounds of hot pigs.

The bay to the north of the center columns is occupied by the electric furnaces, their transformers and necessary control. The furnaces are placed in a line parallel to the length of the building, and are set so that their front side is even with the center line of columns.

Oil for fuel at various points about the plant, except for the limekilns, is run from tank cars into a steel sump tank close to the boiler house. From this tank it is pumped as needed. A third furnace was recently completed and space has been left in the building for three more.

The situation of the plant was determined largely by the location of the natural resources, iron ore, limestone, wood for fuel and the availability of low-priced electric power.

It is situated on the north bank of the Pitt river in Shasta county, at a point about 1½ miles above the junction of the McCloud river with the Pitt, and about six miles above the confluence of the Pitt and the Sacramento rivers.

The president and moving spirit of the company is H. H. Noble, and C. B. Morgan is secretary, both of San Francisco, where the main offices are located. The plant manager and metallurgist, John Crawford Jr., makes his headquarters in the works at Heroult. During the various experiments and changes which led up to the present construction of the plant, the company had the advise and co-operation of a number of eminent metallurgists, including Dr. Paul Heroult and S. T. Wellman.

Great Output of Lime

Figures obtained by the United States Geological Survey from the producers of lime throughout the country show that in 1912 the demand for lime was greater than ever before and that the resulting production was the largest in the history of the industry. The total production of lime in 1912 was 3,529,462 short tons, valued at $13,970,114, as compared with 3,392,915 short tons, valued at $13,689,054 in 1911, an increase of 136,547 short tons in quantity and $281,060 in value.

The total number of plants operating in 1912 was 1,018, as compared with 1,139 in 1911. This decrease in the number of producers was due in large part to the inactivity of small kilns operated by farmers for burning lime for local use as a soil sweetener and in part to the tendency of the industry toward concentrating plants into fewer and larger units. The heaviest decrease in the number of producers was in Pennsylvania.

The uses to which lime is put are many. The quantity of building lime used in 1912 was 1,556,446 short tons, which exceeded that of 1911 by 67,879 tons, but that the value, $6,571,479, was $184,410 less than the value in 1911.

Design of Modern Open-Hearth Steel Furnaces[1]

The Tilting and Stationary Types Compared and the Advantages and Disadvantages of Both Melting Mediums Pointed Out

By Benjamin Talbot

During the last quarter of a century perhaps no fact has been more striking in connection with the manufacture of steel than the gradual replacement of Bessemer by the open-hearth process. It is well-known that this extension of the open-hearth method is becoming more and more rapid, and as the author has made a study of the variation in design in the chief forms of furnaces used to carry out the process, it has occurred to him that a paper dealing more especially with the development of the tilting form of open-hearth furnace might not be without interest.

It is some 15 years since the author designed the first tilting furnace erected by him in America. Although tilting furnaces were not unknown at that date, and had been condemned, the furnace erected under his supervision at Pencoyd about 1898 embraced several features new at that time. An outline of this Pencoyd furnace, which was rated at 75 tons, is shown in Fig. 1. It was in this furnace that the first trials of the continuous process were carried out. Although at that time the furnace gave good results, the furnaces which have been erected during recent years under the author's supervision are in many points a very great improvement on his original design.

[1]Presented at the annual meeting of the Iron and Steel Institute.

Prejudice Against Tilting Top

In studying the design of other furnaces the author has been impressed by the seeming want of initiative on the part of modern furnace designers in not studying the possibility of improvements in the design of the tilting type of furnace. He cannot understand the attitude of mind of these engineers unless there is, as he believes, a strong prejudice against this type of furnace. The only alternative that occurs to him to account for their attitude is that they imagine finality has been reached in the design of these furnaces, which would be an absurd position to take.

This attitude of mind is the more difficult to understand, as several of the large corporations in America have such wide resources and special facilities for experimental work, that they could readily build one or two of these large tilting furnaces in the same shops as their ordinary fixed furnaces. Thereby they would be enabled to work under exactly similar conditions of shop practice and materials as their fixed furnace plant, and the question of the respective merits of each type of furnace under varying conditions

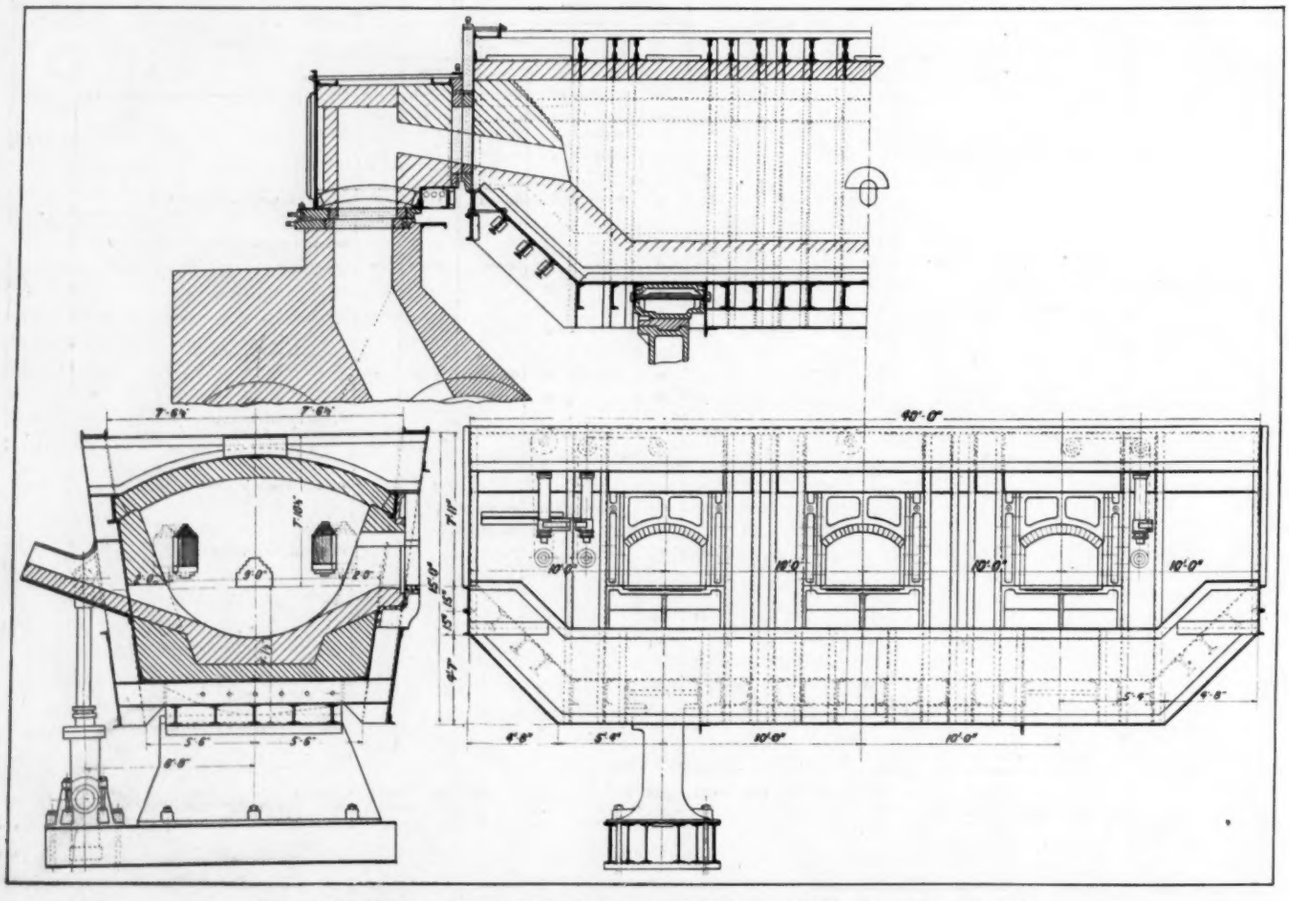


FIG. 1—TILTING OPEN-HEARTH STEEL FURNACE, PENCOYD IRON WORKS

TABLE I—RATING OF ENGLISH OPEN-HEARTH FURNACES

Furnace.	Capacity in Tons.	Width Inside Lining.	Length Between Blocks.	Square Feet of Bath per Ton.	Acid or Basic.	Gas Regenerators.					Air Regenerators.					Size and Area of Gas Uptakes.	Size and Area of Air Uptakes.
						Dimensions of Chequer Work.				Capacity in Cubic Feet.	Cubic Feet per Ton.	Dimensions of Chequer Work.				Capacity in Cubic Feet.	Cubic Feet per Ton.		
		Ft. In.	Ft. In.			Ft. In.	Ft. In.	Ft. In.				Ft. In.	Ft. In.	Ft. In.					
A[1]	250	18 0	42 0	2·69	Basic	20 0	8 0	17	0	2720	10·88	20 6	10 0	17	0	3400·0	13·6	1 Uptake 3′ 6″ × 3′ 0″ = 10·82□′	2 Uptakes 3′ 6″ × 3′ 0″
B	200	14 0	44 0	3·08	Basic	20 6	8 0	11	0	1804	9·02	20 6	10 0	11	0	2255·0	11·275	1 Uptake 3′ 0″ × 3′ 0″ = 9·0□′	2 Uptakes 3′ 0″ × 2′ 3″
C[1]	150	15 6	40 0	4·00	...	22 0	8 0	9	0	1584	10·56	22 0	10 0	9	0	1980·0	13·2	.....	.....
D	150	15 0	40 0	4·00	Basic	22 0	7 8	10	0	1936	11·24	22 0	9 8	10	0	2126·0	14·17	1 Uptake 3′ 6″ × 4′ 2″ = 14·6□′	2 Uptakes 4′ 2″ × 3′ 3″
E[1]	125	12 10	34 0	3·49	...	22 0	6 3	8	0	1100	8·80	22 0	8 9	8	0	1540·0	12·32	.....	.....
F	120	13 0	26 3	2·93	Basic	9 6	Diam.	30	3	2144	17·85	9 6	30 3	...		2144·0	17·86	.....	.....
G	100	12 0	30 6	3·66	Basic	22 0	6 6	6	0	858	8·58	22 0	8 0	6	9	1188·0	11·88	1 Uptake 3′ 0″ × 3′ 0″ = 12·56□′	2 Uptakes 2′ 6″ × 2′ 0″ = 21·99□′
H	80	13 0	28 0	7·28	Acid	12 0	9 6	9	6	1083	21·66	12 0	9 6	9	6	1083·0	21·66	.....	.....
I	50	11 3	28 0	6·30	Acid	12 3	9 6	9	3	1076	21·52	12 3	9 6	9	3	1076·0	21·52	1 Uptake 30″ × 324″ = 7·0□′	2 Uptakes 24″ × 30″ = 14·0□′
J	50	14 0	32 0	9·00	Acid	14 0	6 6	12	0	1092	21·80	14 0	6 6	12	0	1428·0	28·56	.....	.....
K	50	12 0	24 0	5·76	Basic	11 6	6 0	12	0	820	16·56	11 3	9 0	12	0	1215·0	24·3	.....	.....
L	50	13 2	28 0	7·36	Basic	16 0	7 0	17	0	1904	38·00	16 0	9 0	16	0	2304·0	46·8	2 Uptakes 12″ × 28″ = 6·72□′	2 Uptakes 18″ × 33″ = 11·88□′
M	50	11 8	28 0	6·52	Basic	14 0	7 0	13	0	1274	25·48	14 0	9 0	12	6	1575·0	31·5	2 Uptakes 12″ × 28″ = 6·72□′	2 Uptakes 18″ × 33″ = 11·88□′
N	45	12 6	33 0	8·33	Basic	22 0	6 0	9	3	1221	27·13	22 0	6 0	9	3	1221·0	27·13	.....	.....
O	40	11 3	34 0	6·75	Acid	12 1	9 0	9	3	1008	25·15	12 1	9 0	9	3	1008·0	25·15	1 Uptake 30″ × 194″ = 5·82□′	2 Uptakes 24″ × 194″ = 9·66□′
P	40	11 3	28 0	7·80	...	18 3	7 0	13	6	779	19·25	8 3	8 0	13	6	890·0	22·2	.....	.....
Q	40	12 0	24 0	7·40	Basic	12 0	6 0	11	3	810	20·00	12 0	11 3	11	3	1319·0	37·9	2 Uptakes 18″ × 22″ = 7·92□′	2 Uptakes 10″ × 18″ & 10″ × 22″ = 8·56□′
R	40	11 6	30 0	8·68	Basic	11 6	14 6	4	6	294	7·30	12 0	9 6	7	0	720·0	19·75	2 Uptakes 16″ × 14″ = 4·66□′	2 Uptakes 24″ × 16″ & 24″ × 18″ = 12·66□′
S	40	10 8	30 1	8·01	Basic	12 0	7 0	7	0	609	15·20	12 0	8 6	7	0	714·0	17·60	2 Uptakes 18″ × 14″ = 8·04□′	2 Uptakes 22″ × 15″ = 8·25□′
T	37	11 6	26 0	8·05	Basic	13 6	7 9	6	9	706	19·00	13 6	8 1½	6	9	744·0	20·10	2 Uptakes 16″ × 14″ = 4·66□′	2 Uptakes 24″ × 18″ & 24″ × 16″ = 13·00□′
U	35	12 2	25 6	8·10	...	10 8	7 6	9	6	780	21·70	10 8	8 6	9	6	861·0	24·6	.....	.....
V	30	11 0	22 0	8·06	Acid	8 0	7 0	13	9	770	25·66	8 0	7 0	13	9	770·0	25·66	.....	.....
W	30	11 0	24 0	8·80	Acid	13 3	7 6	12	0	1192	39·70	13 3	9 0	12	0	1431·0	47·70	.....	.....
X	30	10 6	26 0	9·90	Acid	13 4	6 6	5	10	505	16·83	13 4	8 0	5	9	612·0	20·40	.....	.....
Y	25	10 6	22 3	9·30	Basic	12 0	4 6	5	0	270	10·80	12 0	6 0	4	3	306·0	12·40	.....	.....
Z	25	11 0	25 6	11·20	Basic	13 0	6 11	10	2	909	31·20	13 0	7 8	10	2	1313·0	40·52	.....	.....
a	...	10 8	22 6	...	Basic	13 0	6 11	10	11	922	...	13 0	7 8	10	3	1024·0	...	.....	.....
b	20	9 8	24 0	11·50	...	9 9	5 0	12	0	585	29·25	9 0	7 0	12	0	819·0	40·95	.....	.....
c	20	9 8	20 0	9·66	Basic	7 6	Diam.	12	0	530	26·50	8 3	Diam.	12	0	603·12	30·15	1 Uptake 21″ × 24″ = 5·76□′	1 Uptake 33″ × 24″ = 7·75□′

TABLE I, CONTINUED

Furnace.	Square Inches per Ton in Gas Uptakes.	Square Inches per Ton in Air Uptakes.	Gas Ports.			Air Ports.			Valves.				Chimney.		Remarks.
									Gas.		Air.				
			Dimensions.	No.	Area.	Dimensions.	No.	Area.	Size.	Type.	Size.	Type.	Inside Diameter.	Height.	
			Ft. In. Ft. In.		Square Inches.	Ft. In. Ft. In.		Square Inches.	Inches.		Inches.		Ft. In.	Feet.	
A[1]	9·0	14·4	3 6 × 2 6	1	8·75	8 0 × 2 9	1	19·2	42	Waterseal	...	Butterfly	6 6	140	Talbot furnace.
B	10·8	16·2	2 2 × 2 6	1	5·4	5 9 × 2 9	1	15·8	42	Waterseal	...	Butterfly	6 0	126	" "
C	...	...	2 6 × 2 8	1	4·16	2 3 × 2 10	2	11·04	...	...	...	...	...	...	" "
D	22·6	18·0	2 3 × 2 1½	1	5·0	7 6 × 3 0	1	23·0	42	Waterseal	...	Butterfly	6 0	126	Hollow billet chills 10″ × 6″, Talbot furnace.
E[1]	...	...	.....	...	...	.....	...	...	...	...	...	...	...	...	" "
F	...	...	.....	1	5·29	.....	1	7·44	23	...	36	...	...	...	Preliminary furnace.
G	12·96	21·6	1 8 × 1 10	1	3·05	2 3 × 2 2	2	14·04	42	Waterseal	42	Butterfly	6 0	120	Talbot furnace.
H	...	...	2 0 × 1 6	1	3·00	2 3 × 1 6	2	6·6	27	...	27	...	...	...	.....
I	15·3	28·8	2 6 × 1 6	1	3·75	2 0 × 1 9	2	7·0	30	...	30	...	...	...	.....
J	...	...	1 0 × 1 3	2	2·50	1 3 × 2 3	2	5·25	36	...	42	...	...	...	.....
K	...	...	.....	...	...	.....	...	...	...	...	...	...	...	...	Fuel burned per hour = 1764 lbs.
L	13·44	23·96	0 9 × 1 3	2	1·87	3 3 × 1 3	2	8·12	54	Double beat	54	Double beat	7 3	175	.....
M	13·44	23·96	0 9 × 1 3	2	1·87	3 3 × 1 3	2	8·12	36	...	48	Butterfly	...	...	.....
N	...	...	.....	...	...	.....	...	...	...	...	...	...	...	...	Fuel burned per hour = 2240 lbs.
O	13·8	22·2	1 9 × 1 3	1	2·18	2 4 × 1 6	2	6·99	29	...	29	...	...	...	.....
P	...	...	1 6 × 1 2	2	3·50	6 6 × 1 3	1	8·66	27	...	27	...	...	...	.....
Q	19·6	20·9	1 6 × 1 2	2	...	12 0 × 1 0	1	...	...	...	...	...	3 0	...	Fuel burned per hour = 1764 lbs.
R	11·2	30·0	1 0 × 1 2	2	2·34	2 0 × 1 10 / 1 4 × 1 7	3	9·20	36	Waterseal	42	Butterfly	...	...	.....
S	12·60	20·70	1 2 × 1 2	2	2·68	2 3 × 1 1	2	2·96	32	Forter	30	Butterfly	4 3	120	.....
T	12·1	32·4	1 0 × 1 2	2	2·34	2 0 × 1 10 / 1 4 × 1 7	3	9·20	26	Double beat	42	Butterfly	...	...	Fuel burned per hour = 1881 lbs.
U	...	...	1 6 × 2 4	1	3·50	1 6 × 2 3	2	7·00	30	...	33	...	...	...	.....
V	...	...	.....	...	...	.....	...	...	...	...	...	...	...	...	.....
W	...	...	1 2 × 1 7	2	3·66	1 9 × 0 10	3	4·33	30	...	33	...	...	...	.....
X	...	...	1 3 × 1 2	2	2·91	6 3 × 1 4	1	8·16	27	...	30	...	...	...	.....
Y	...	...	2 0 × 1 6	1	3·00	2 0 × 1 6	2	6·00	27	...	30	...	...	...	.....
Z	...	...	2 4 × 1 3	1	2·91	2 4 × 1 3	2	5·82	27	...	30	...	...	...	.....
a	...	...	2 0 × 1 1	2	4·30	2 0 × 1 2½ / 2 0 × 1 6	3	6·33	30	...	33	...	...	...	.....
b	...	...	0 10½ × 1 0	2	1·75	4 4 × 1 0	1	4·33	23	...	26	...	...	...	Temperature of gases in chimney flue = 545° F.
c	28·8	39·6	1 0 × 1 2	2	2·32	5 6 × 9 0	1	4·12	24	...	29	Butterfly	3 6	120	.....

Dimensions of chambers in place of checker work, gas and air regenerators are denoted thus[1]. In all cases of checkers and ports, the sizes are given across the width of the furnace first; those going with the length of the furnace, second, and in case of the checkers, the depth is given last. The sizes of the checkers are taken from the top of bearers to top of bricks in all cases except those marked [1].

could be worked out in a practical way.

It is to the credit of one of the largest continental steel-making firms that it has adopted this method of practically proving the advantages and disadvantages of each type of furnace, and of varying methods of working.

So far as the author understands, the two main criticisms of tilting furnaces are the initial capital outlay and the increased cost of upkeep. In the following the author hopes to combat both these objections, and at the same time to point out some of the salient advantages that accrue from the use of these tilting furnaces as against the fixed type.

In examining the drawing of the Pencoyd furnace shown in Fig. 1, it will be noted that the furnace is furnished with a block inside the tilting section proper, and in this respect it resembles in every respect the arrangement found in the ordinary fixed furnace. This was found to be the point which gave the greatest trouble in the earlier form of tilting furnaces. Where, as was usual, the furnace was provided with two air and one gas port in the center, it was found that by placing separate water-cooled chills around the opening of each port, both on the tilting section and on the movable port end, equilibrium was established whereby after, say about one-half of the original length of block in the furnace had burnt back, the influence of the water-cooled chill was sufficient to maintain the remaining half in fair working condition. This, however, only mitigated the evil, and the lime dust and oxide and the cutting action of the flame against the block prevented the furnace from having a long campaign.

Water-Cooling

After trying, in various ways, to improve the life of the block with more or less success, a radical departure in water-cooling was finally decided upon, and for some time the furnaces have been built with no block whatever in the tilting section of the furnace itself, the space formerly occupied by the block being now a large central opening in which the incoming air and gas meet and combustion takes place. This arrangement is shown in Fig. 2, which also illustrates the water-cooling arrangements used in connection with it.

With the port arrangements of the design, shown in Fig. 2, it is possible to run the furnace indefinitely as far as the port repairs are concerned. In no other respect has any change of importance been made in the design of the furnaces as now installed as against those first built at the Frodingham Co.'s works, except, of course, that the more recent furnaces are of a capacity of 200 to 250 tons, as against the original 75-ton furnace at Pencoyd, and the 100-ton furnace at Frodingham.

When comparing the tilting furnace with the fixed type, especially the large tilting furnaces now commonly used, it must be remembered that the floor space occupied is far less in the case of the tilting furnace per ton of output obtained. This again leads to an economy in the cost of the building which houses the furnaces. Considering it, therefore, from every point of view, the author contends, that such expensive fixed furnaces are being built, provided with every appliance that is considered essential in a well-equipped tilting furnace plant, such for instance as charging cranes, overhead casting cranes, ample floor space, arrangements for casting on cars, etc., that the 200-ton tilting furnace will turn out to be a cheaper plant to erect for large tonnage when regard is had to the quantity of output obtained. In this connection also it is well to remember that it is really only the tilting section in a tilting furnace plant that

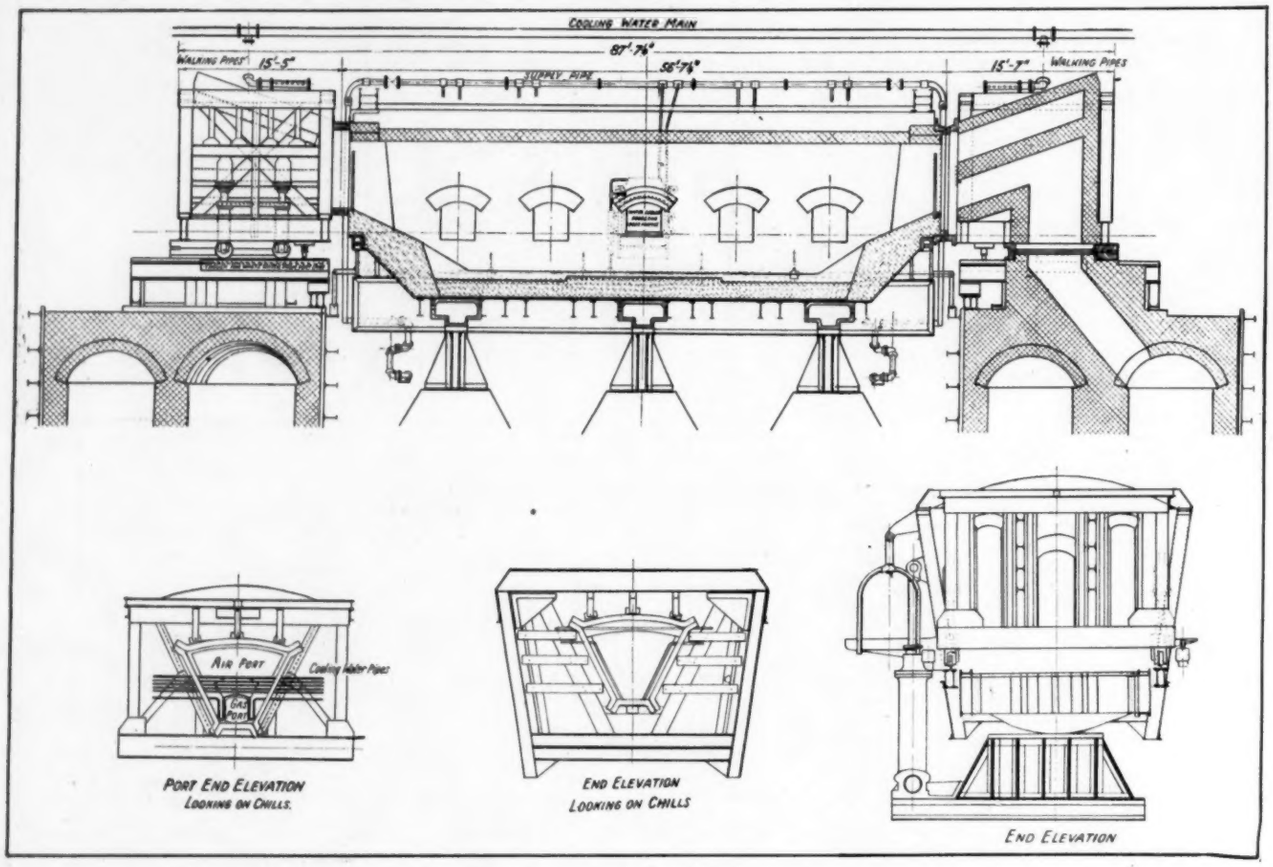


FIG. 2—HOW THE COOLING WATER PIPES ARE ARRANGED IN A TALBOT TILTING FURNACE

TABLE II—RATING OF AMERICAN AND CONTINENTAL OPEN-HEARTH FURNACES

AMERICAN FURNACES.

Furnace.	Capacity in Tons.	Width Inside Lining.	Length Between Blocks.	Square Feet of Bath per Ton.	Acid or Basic.	Gas Regenerators. Dimensions of Chequer Work.				Gas Regenerators. Capacity in Cubic Feet.	Gas Regenerators. Cubic Feet per Ton.	Air Regenerators. Dimensions of Chequer Work.				Air Regenerators. Capacity in Cubic Feet.	Air Regenerators. Cubic Feet per Ton.	Size and Area of Gas Uptakes.	Size and Area of Air Uptakes.
		Ft. In.	Ft. In.			Ft. In.	Ft. In.	Ft. In.				Ft. In.	Ft. In.	Ft. In.					
d^1	250	16 6	41 6	2·73	...	21 0	7 6	15 9		2480·6	9·92	21 0	12 4½	15 9		4065·0	16·26	.....	.....
e^1	200	14 6	40 0	2·9	...	20 0	9 6	21 0		5780·0	28·93	20 0	12 6	21 6		7612·0	38·06	.....	.....
f^1	200	16 0	40 0	3·2	...	25 0	8 0	12 0		2400·0	12·0	25 0	11 0	12 0		3300·0	16·5	.....	.....
g^1	100	15 0	20 0	3·96	...	25 9	8 7	17 9		3012·48	26·08	25 9	14 8	17 9		6885·0	44·56	.....	.....
h^1	60	16 9	43 0	12·0	...	22 3	8 2	13 4		2417·0	40·28	20 8	14 2	14 4		4198·0	69·96	.....	.....
i	60	13 6	36 0	8·10	Basic	16 0	6 6	14 0		1455·0	24·20	16 0	8 6	14 0		1905·0	31·80	1 Uptake 30" × 30" = 900□"	2 Uptakes 28" × 28" = 1368□"
j	50	13 0	32 0	8·32	...	23 6	12 0	8 6		2367·0	47·34	35 0	11 6	8 6		3431·0	68·62	.....	.....
k	50	14 0	27 0	7·56	...	22 0	6 0	8 6		1122·0	22·40	22 0	10 0	8 6		1870·0	37·40	.....	.....
l	50	13 0	31 0	10·07	...	...	...	...		...	...	12 0	12 0	13 9		2040·0	66·00	.....	.....
m	50	12 8	34 0	8·6	Basic	24 6	7 0	14 0		2401·0	48·20	24 6	10 9	14 0		3687·0	73·74	2 Uptakes 29" × 30" = 1740□"	2 Uptakes 28" × 36" = 2016□"
n	50	16 0	29 0	9·28	...	17 0	10 1	14 6		3485·0	49·7	17 0	12 1	14 6		2979·0	59·58	.....	.....
o	40	13 0	34 0	11·05	...	22 0	6 3	13 0		1787·0	44·70	22 0	8 9	13 0		2501·0	62·5	.....	.....
p	40	12 6	21 0	9·68	Basic	17 0	6 6	15 0		1687·0	41·42	17 0	8 6	15 0		2167·0	54·17	1 Uptake 30" × 32" = 960□"	2 Uptakes 28" × 30" = 1680□"
q	40	15 1½	27 0	10·31	Basic	19 0	7 7½	13 6		1958·6	48·80	19 0	11 7½	13 6		2981·3	74·3	3 Uptakes 24" × 33" & 24" × 24" = 1944□"	3 Uptakes, 24" × 33" & 24" × 36" = 2316□"
r	25	11 6	26 0	12·00	...	11 0	5 0	18 0		990·0	39·60	11 0	7 3	18 0		1435·0	57·4	.....	.....
s	20	12 0	22 0	13·2	...	10 6	Diam.	10 6		909·0	45·40	12 0	Diam.	10 6		1187·0	59·3	.....	.....
ab	20	9 8	21 0	10·80	...	12 10	8 1	10 0		1637·0	81·80	12 10	9 1	10 0		1165·0	58·25	.....	.....

CONTINENTAL FURNACES.

t^1	200	14 9	45 3½	3·34	Basic	...	...	...		...	...	...	...	...		...	...	1 Uptake 1' 0" × 2' 6" = 1800□"	2 Uptakes 1' 0" × 2' 6"
u	30	10 6	26 11	9·40	...	12 9½	9 10	14 0		1788	59·60	11 5	10 11	14 0		1770·0	59·00	.....	.....
v	25–30	11 1	24 7	12·18	...	13 1	5 3	10 2		697	25·34	13 1	9 4	10 2		1230·0	45·66	.....	.....
w	15–18	11 2	21 3	13·08	...	10 3	6 2	10 1½		639	38·72	10 3	9 2	10 1½		951·0	57·91	.....	.....
x	40	11 8	30 0	8·74	Basic	22 6	7 0	9 0		1396	34·90	22 6	10 9	9 0		2176·6	54·42	2 Uptakes 49" × 23" = 2256□"	2 Uptakes 61" × 32" = 3264□"
y	...	9 2½	21 4½	...	...	...	...	...		...	...	...	...	...		...	...	.....	.....
z	30	10 6	25 0	8·75	Basic	12 6	6 0	10 2		1702	25·40	12 6	10 0	9 4½		2633·0	87·77	1 Uptake 30" × 30" = 900□"	2 Uptakes 24" × 24" = 1152□"

TABLE II, CONTINUED

AMERICAN FURNACES.

Furnace.	Square Inches per Ton in Gas Uptakes.	Square Inches per Ton in Air Uptakes.	Gas Ports. Dimensions.	Gas Ports. No.	Gas Ports. Area.	Air Ports. Dimensions.	Air Ports. No.	Air Ports. Area.	Valves. Gas. Size.	Valves. Gas. Type.	Valves. Air. Size.	Valves. Air. Type.	Chimney. Inside Diameter.	Chimney. Height.	Remarks.
			Ft. In. Ft. In.		Square Inches.	Ft. In. Ft. In.		Square Inches.	Inches.		Inches.		Ft. In.	Feet.	
d^1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Talbot furnace.
e^1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Chambers found to be too large, and subsequently very considerably reduced. Talbot furnace.
f^1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Talbot furnace.
g^1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.....
h^1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.....
i	16·1	26·1	2 8 × 2 6	1	6·06	2 4 × 2 4	2	10·40	42	Dyblie	48	Butterfly	7 0	140	.....
j	...	...	6 0 × 1 6	1	9·00	6 0 × 2 3	1	13·5	42	...	42	...	...	...	.....
k	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.....
l	...	...	3 3 × 1 4	1	4·50	6 6 × 1 8	1	19·83	...	...	...	...	...	...	.....
m	34·8	40·32	2 5 × 1 6	2	7·46	2 4 × 1 6	2	6·98	42	Forter	48	Forter	6 0	150	.....
n	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.....
o	...	...	1 10 × 1 7	1	2·90	2 3 × 3 0	2	13·5	42	..	48	...	...	...	.....
p	21·1	42·0	2 8 × 2 6	1	6·66	2 6 × 2 4	2	11·5	36	Forter	42	Butterfly	5 6	140	.....
q	38·6	72·90	2 0 × 1 6 / 2 0 × 2 9	3	14·00	9 9 × 1 4½	1	12·90	...	...	...	...	...	...	.....
r	...	...	4 6 × 1 0	1	4·90	6 0 × 1 2	1	7·00	32	...	36	...	...	...	.....
s	...	...	1 0 × 1 0	2	2·00	1 0 × 1 0	3	3·00	30	...	30	...	...	...	.....
ab	...	...	1 1½ × 1 3	2	2·75	9 8 × 1 2	1	12·08	27	...	27	...	...	...	.....

CONTINENTAL FURNACES.

t^1	9·00	18·00	2 1½ × 2 3½	1	4·80	8 1 × 1 11½	1	18·94	...	Waterual	...	Butterfly	...	...	Talbot furnace.
u	...	...	1 11½ × 1 3½	2	5·16	5 3 × 1 2	1	6·08	36	...	36	...	...	...	.....
v	...	...	1 3½ × 0 11½	...	1·97	11 1½ × 0 11½	...	10·90	...	...	37	...	...	...	.....
w	...	...	1 3½ × 0 11½	...	1·97	10 2 × 1 2½	...	12·60	...	...	37	...	...	...	.....
x	31·45	82·35	1 6 × 1 4	2	3·98	3 8 × 1 0	2	7·66	...	...	...	...	...	...	.....
y	...	...	2 11½ × 1 5½	2	8·58	7 10 × 0 11½	1	7·75	...	...	...	...	...	...	.....
	30·00	38·40	2 0 × 1 6	1	3·00	2 4 × 1 5	2	6·66	30	Forter	30	Forter	6 0	130 0	.....

Dimensions of chambers in place of checker work, gas and air regenerators are denoted thus[1]. In all cases of checkers and ports, the sizes are given across the width of the furnace first; those going with the length of the furnace, second, and in case of the checkers, the depth is given last. The sizes of the checkers are taken from the top of bearers to top of bricks in all cases except those marked [1].

varies essentially from the fixed furnace plant, as the chambers, flues, etc., are common to and equal in both designs. Modern fixed furnaces rated as of 60 to 80 tons capacity are now being erected in the United States in which the chambers are larger than those used on the large 200-ton Talbot tilting furnaces, and consequently, the cost, apart from the tilting section, cannot be less than that necessary for installing a large tilting furnace. Again, on analyzing the cost of the various items making up the tilting section, we find that many of them are common to either design; for example, the water-cooled doors, the door framings, cheek pieces, etc., and in modern fixed furnaces, the water-cooling devices, are common to both types. It is a fact, also, that the tilting section, apart from the necessary brickwork, is quite a small item in the cost of a complete tilting furnace plant, capable of, say, an output of 1,200 to 1,400 tons of finished steel per week from each tilting furnace.

Considering the tilting furnaces broadly, we find they have found employment in the three following cases:

1.—As preliminary refining furnaces.

2.—As steel-making furnaces, using either molten or cold stock.

3.—For the continuous process of steel-making.

In 1892 the author designed for the Tennessee Iron & Coal Co. what he believes was the first tilting furnace ever used for the preliminary refining of pig iron.

The pig iron he had to deal with was high in silicon and also phosphoric. His problem was to desiliconize the metal in the preliminary tilting furnace, and pass on the refined metal for subsequent further treatment in fixed basic open-hearth furnaces. Since that date this use of the tilting furnace as a preliminary refiner has found wide application. The author admits that when very silicious molten pig iron has to be treated, which is not so suitable for direct use in the steel-making furnace, there is much to be said for this use of the tilting furnace as a preliminary refiner. On the other hand, he is of opinion that with a good quality of pig metal, low in silicon and sulphur, much of the pig iron that is passed through these so-called mixers would be much better retained there and made into steel with one set of men. The question often really resolves itself into a blast-furnace problem rather than a steel-making one. If the blast-furnace manager really cannot make a pig iron sufficiently low in sulphur to treat economically in the steel furnace without an unduly high percentage of silicon, then perhaps the production of a fairly high silicon iron in the blast-furnace, a desiliconization of this iron in a preliminary tilting furnace, and its subsequent treatment in a second steel-melting furnace, is the more economical method of procedure; but the question is a complex one, and the local conditions have to be taken into full consideration.

It is the custom in some works, especially in the one the author has in his mind, to treat the metal in the large preliminary refining furnace, and then to pass it along to a basic Bessemer plant.

As to the use of the tilting furnace, for finishing-off each individual heat, the author has had but little experience of working in this way, as he has found that there is always a tendency for the practical steel melter to keep back

(*Continued on page* 508.)

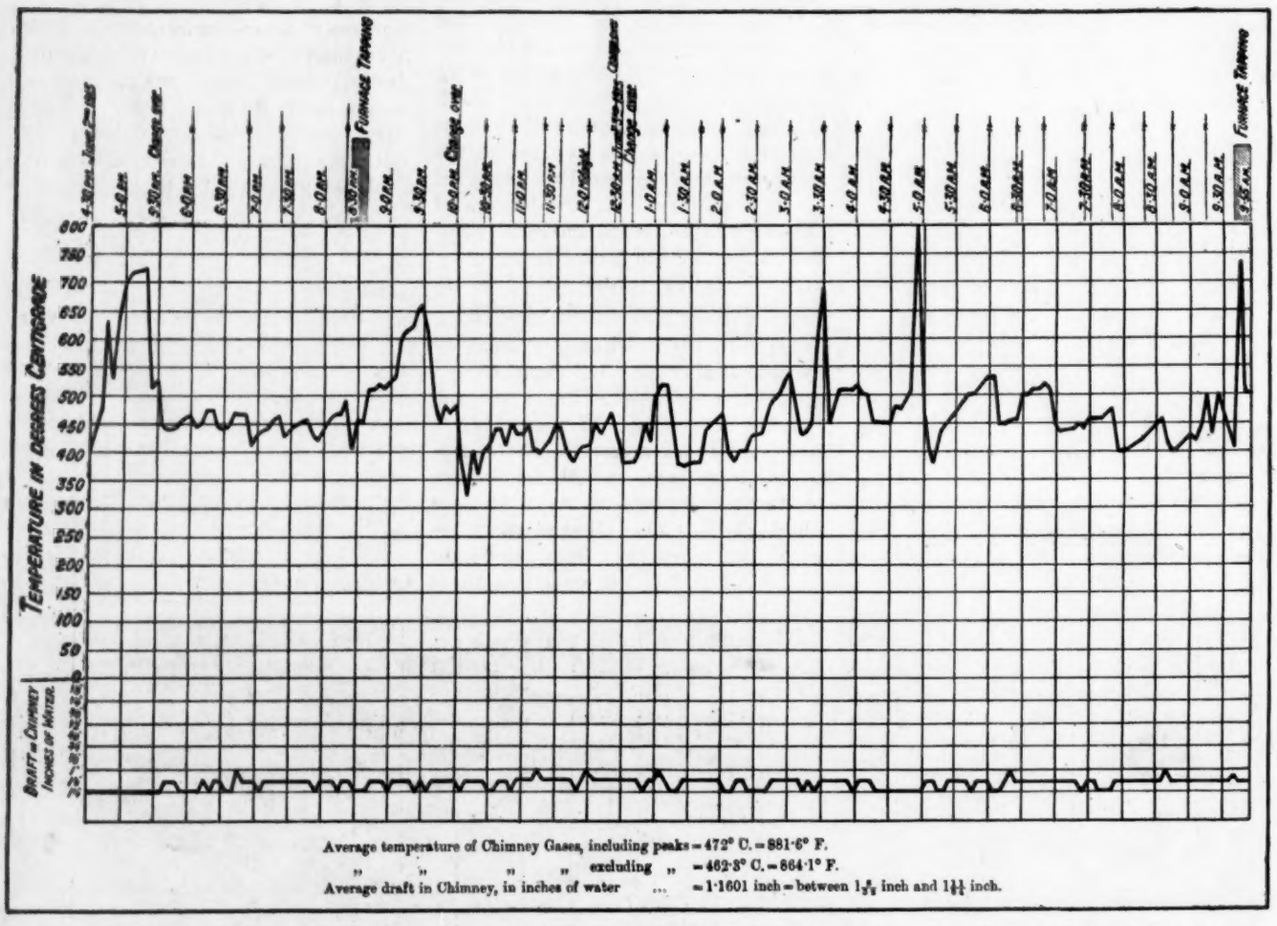

Temperature in degrees Centigrade
Draft = Chimney Inches of Water.
Average temperature of Chimney Gases, including peaks = 472° C. = 881·6° F.
" " " " excluding " = 462·8° C. = 864·1° F.
Average draft in Chimney, in inches of water ... = 1·1601 inch = between 1 5/8 inch and 1 11/16 inch.

FIG. 3—CHART OF READINGS TAKEN AT FIVE-MINUTE PERIODS FOR 17 HOURS, OF THE TEMPERATURE AT THE BASE OF A TILTING OPEN-HEARTH FURNACE STACK

Increasing the Production While Rebuilding---II

Description of the New Foundry Built by the Canadian Locomotive Co.—Features of the Electrical Equipment

By C A Tupper

In the preceding article was described the reconstruction of the Canadian Locomotive Co.'s plant at Kingston, Ont., with various details of the work in the shops. In point of time of reconstruction, however, the foundry comes first, as it has been completed in advance of the other buildings. This shop covers a ground area of 242 x 158 feet.

The building is of steel frame construction, with concrete foundation and brick walls. It consists of a main bay and monitor, two side bays and a crane runway open at the side and end. This runway also extends 125 feet beyond the front of the building, crossing the incoming and outgoing spurs of the Grand Trunk railway, as well as the industrial trackage of the works at both ends.

The Storage Yard

The ground under the crane runway, at the rear, is used for storage of coke, pig iron and scrap. Rails have been placed along the inner side from the storage piles to the charging platform, and on these are operated Whiting trucks, with lifting handles on the corners. Coke is shoveled into the trucks, while the pig iron and scrap are loaded by means of an Electric Controller & Mfg. Co.'s magnet suspended from a 10-ton Whiting crane, with 40-foot span, which serves the entire length of the runway. The magnet also handles castings in the foundry. Each truck, after receiving its load, is weighed on a small track scale, and, when a number have been assembled, they are picked up by the same crane and deposited on the steel charging platform. As the flanges of the wheels are inward on both sides, the trucks balance properly and can easily be rolled across the floor to the receiving doors of the cupolas.

There are two Whiting cupolas of the No. 7 and No. 3½ standard designs, in a suitable brick, steel and concrete setting with the usual roof-hoods and spark arresters. The charging platform was set 21 feet above the furnace bottom so as to permit a high fire. It also allowed room between the foundry floor and the charging platform for construction of a mezzanine floor, on which are mounted two motor-driven cupola blowers and other apparatus.

The Cupola Blowers

The larger blower, built by the P. H. & F. M. Roots Co., is a No. 5½ machine, direct-connected to a 30-horsepower Canadian Westinghouse direct current motor, which is shunt-wound and designed for adjustable speed between 500 and 1,000 revolutions per minute. Its controller, which enables the pressure to be varied at the will of the operator, was supplied by the Electric Controller & Mfg. Co. It includes an automatic starter, together with a field rheostat and a relay for the latter. The starter, being operated from a push button, has the advantage of remote control, that is, from the most convenient position. In addition, automatic starting is provided for, with overload and no-voltage protection. The field rheostat relay allows the motor to be started with full field strength, the rheostat setting being left at the proper position for high speed run-

FIG. 1—GENERAL VIEW OF THE MAIN BAY OF THE CANADIAN LOCOMOTIVE CO.'S FOUNDRY

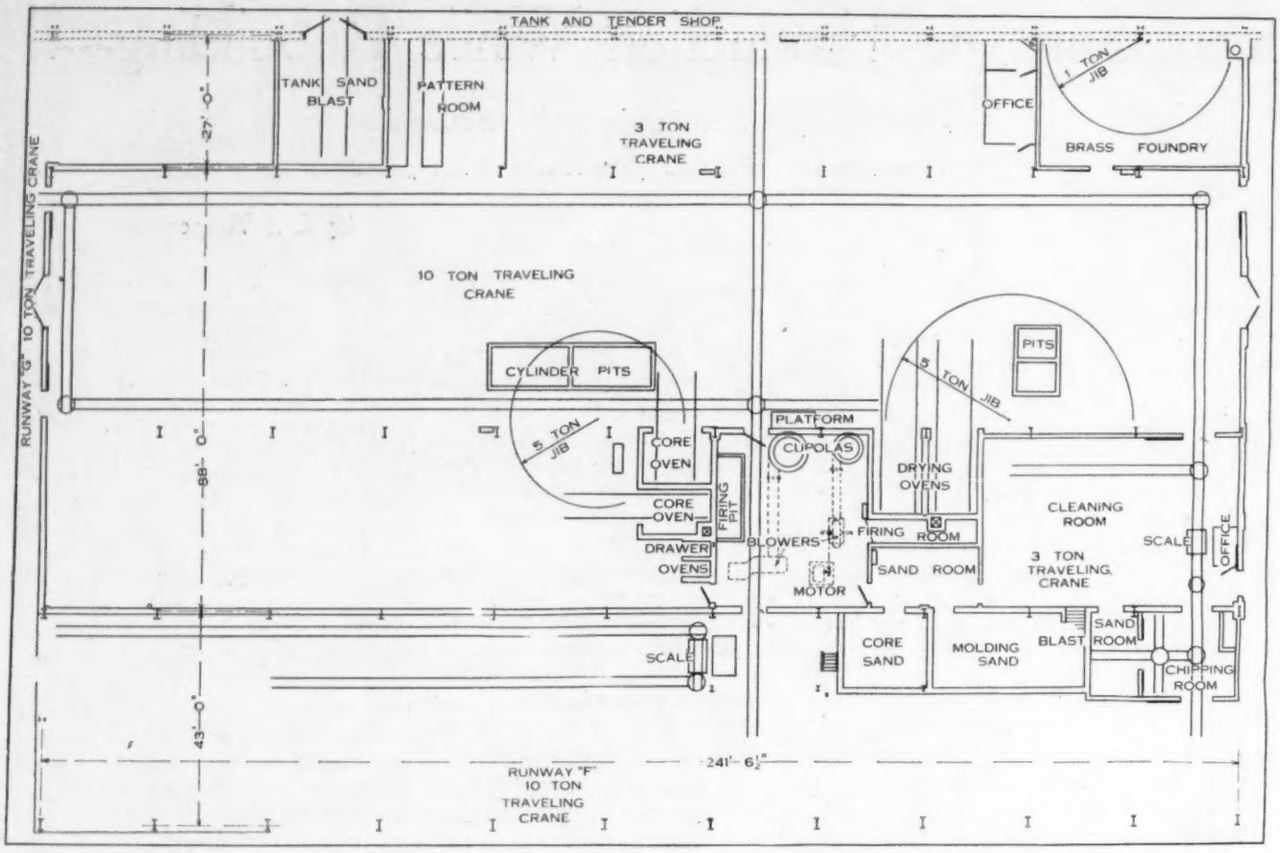


FIG. 2—PLAN OF THE CANADIAN LOCOMOTIVE CO.'S FOUNDRY

ning. This is accomplished from the gradual insertion of field resistance by the relay until the motor is safely accelerated to the desired speed. The Roots blower serves the No. 7 cupola, discharging at the side. For the No. 3½ cupola there is a B. F. Sturtevant Co. high pressure blower, with center discharge, belted to a Canadian Westinghouse 15-horsepower, 1,000 revolutions per minute motor, with rheostatic control.

Between the tapper's platform and the charging floor there is direct telephone connection, and mounted on the cupola front at this point is a master controller by means of which the pressure of the blast for the No. 7 cupola can be regulated according to the operator's judgment. The melting capacity of the cupolas is 35 to 40 tons per day.

Below the charging platform is a Whiting cinder mill, driven by a 6-horsepower, 975 revolutions per minute Canadian Westinghouse motor. Back of the melting department, opening inward from the crane runway, are the several sand bins.

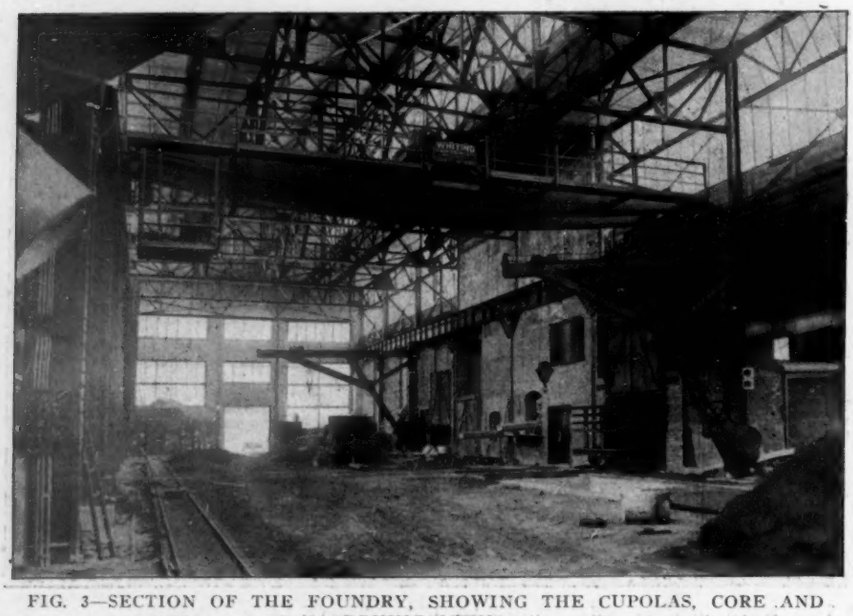


FIG. 3—SECTION OF THE FOUNDRY, SHOWING THE CUPOLAS, CORE AND DRYING OVENS

Coremaking Department

In the east bay of the foundry, south of the cupolas, is the coremaking department. This has been provided with two Whiting drawer ovens, each 3 feet, 2 inches by 5 feet, 10 inches inside dimensions and two ovens, 9 feet and 14 feet in width, respectively, fitted with tracks for frame trucks. At the outer corner of the largest oven is placed a 17½-foot Whiting jib crane, with 5-ton electric hoist, which serves the larger core ovens. All of the cranes are equipped with Westinghouse back-geared crane motors.

There is a firing pit with a stack 21 inches in diameter for the two large core ovens, and a firing room for the pits under the 10 x 17 foot drying ovens which have a 24-inch stack. All core and drying ovens are oil-fired. The drying ovens and cylinder molding floors are served by a 5-ton Whiting jib crane with 26 feet radius.

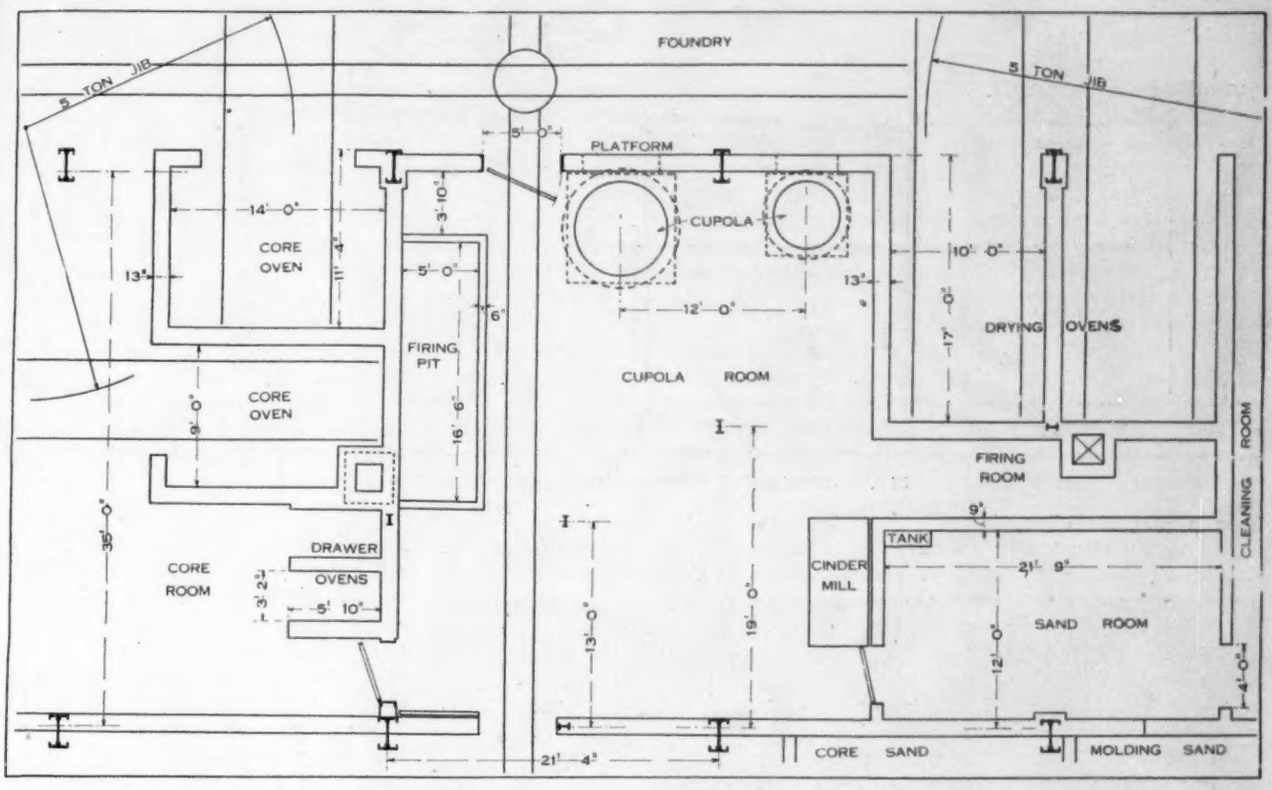


FIG. 4—ARRANGEMENT OF THE CUPOLAS AND DRYING OVENS

The only mechanical equipment at present in use on the floor are Hanna riddles, furnished by the Vulcan Engineering Sales Co., and a core machine installed by the Brown Specialty Machinery Co., both of Chicago. The molding machine equipment to be installed has not yet been definitely decided on.

Cleaning Castings

Back of the drying ovens is a cleaning room for the smaller castings. This is equipped with two 36 x 48-inch Whiting exhaust barrels, complete with dust collector, exhauster and piping, either of which or both together can be driven from a shaft which is belted to a 20-horsepower Canadian Westinghouse 1,000-revolutions per minute motor. The same motor is also connected by belting to the No. 5 Sturtevant fan dust exhauster. This motor, like the others in the plant, except on cranes, is equipped with the Electric Controller & Mfg. Co.'s system of control, including push buttons for starting and stopping. In the same room is a motor-driven grinder, which is connected to the dust exhauster. The cleaning room is spanned by a 3-ton Whiting crane.

Adjoining the main cleaning room is a smaller compartment used for cleaning locomotive cylinder castings. Rails are laid along the end, connecting with the central bay of the foundry, and the castings are brought in on trucks, from which a Yale & Towne chain hoist, running on a monorail, transfers them into the compartment mentioned. The latter is equipped with the Thos. W. Pangborn Co.'s high pressure sand blast system, No. 8 size, operated by a 3-horsepower Crocker-Wheeler motor designed to run at 1,750 revolutions per minute, with 5 per cent variation either way. An exhaust head and Sturtevant fan have been installed above, for taking up the flying sand, and this is put through a Pangborn separator to be used over again.

The main bay of the foundry, where the principal floor work is done, has a 10-ton Whiting crane, with 50-foot span, running its entire length; and this section of the building has been extended 182 feet to the water front as an open crane runway similarly equipped, which serves for storage of foundry flasks and other materials, steel plates, etc. At the end there is a straightening table for large castings. The reheating flame is produced

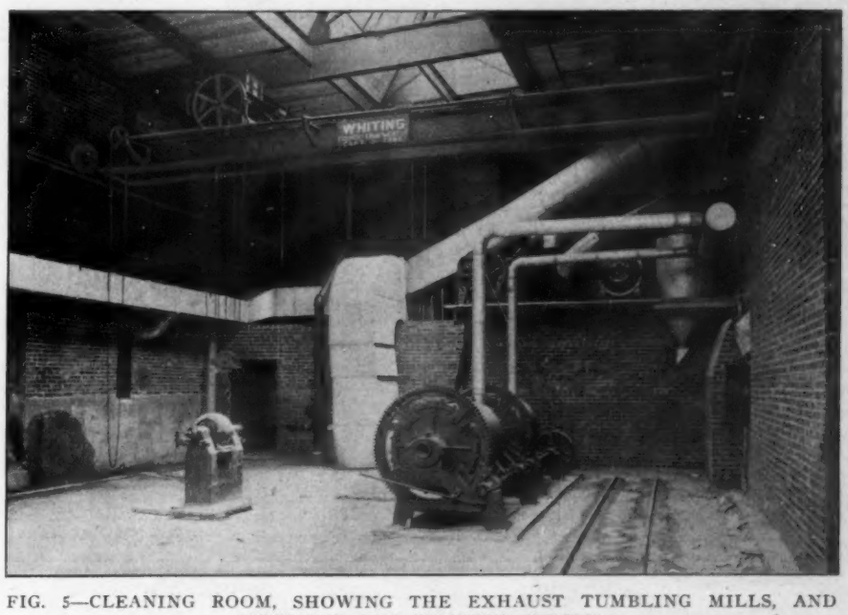


FIG. 5—CLEANING ROOM, SHOWING THE EXHAUST TUMBLING MILLS, AND PIPES FOR THE HEATING SYSTEM

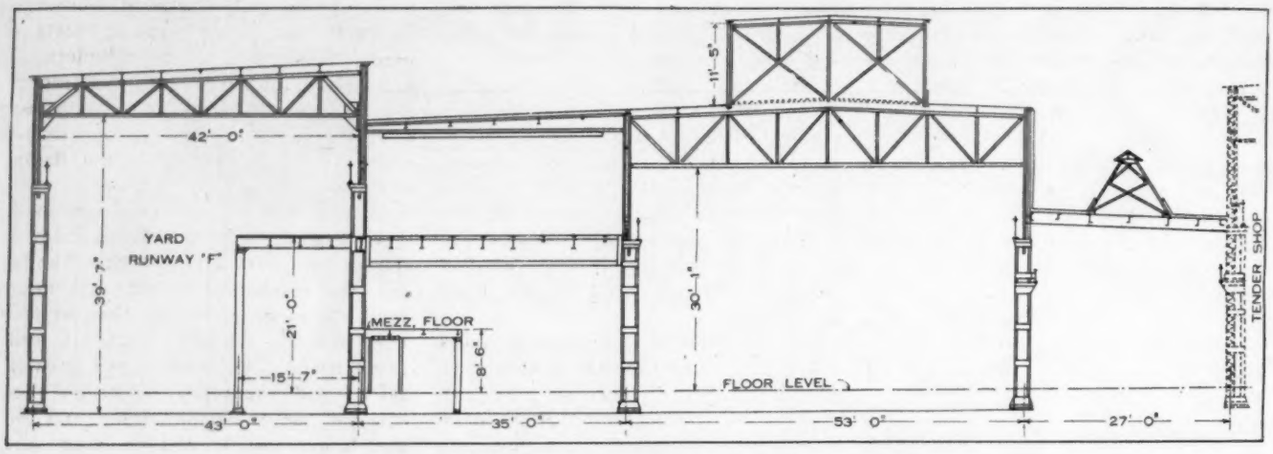


FIG. 6—CROSS-SECTION OF THE FOUNDRY BUILDING

from a portable oil tank outfit furnished by the Hauck Mfg. Co., Brooklyn, N. Y., several of which are used for manifold purposes about the plant. In the floor of the main bay are two pits for large cylinder castings.

The central section of the west bay, which will eventually be fitted out with molding machines, is spanned by a 3-ton 24½-foot Whiting crane. Along the walls of each of the bays, where other arrangements do not interfere, there are also small extension hoists, which can be adjusted to any position desired.

Brass Foundry

At the north end of the east bay a section 41 x 25 feet has been partitioned off for a brass foundry, having two No. 3 Whiting pit furnaces, a tilting furnace, a small portable core oven, a band saw, a water tumbler, and a 1-ton Whiting jib crane. The work done here is relatively unimportant and does not call for any special equipment. Adjoining this department is the foundry office.

At the other end of the bay next to the space reserved for machine molding is a room with racks for the temporary placing of patterns in use.

A permanent pattern storage building, 60 x 70 feet, is just being completed on an adjoining site. This is a six-story building, of heavy mill construction with shelving for the storage of patterns. It is equipped with sprinklers throughout, electrically-lighted and heated by the hot air blast system.

Adjoining and connecting with the pattern storage is a new one-story building, 267 x 61 feet, now under construction, which will be used as a carpenter and patternmaking shop.

New equipment for patternmaking includes a large order placed with the Oliver Machinery Co., Grand Rapids, Mich. This comprises two saw benches with universal saw guards, a 24-inch surfacer, a 20-inch hand planer and jointer, a combination lathe which swings 96 inches over the sole plate and will turn 78 inches between centers, a 20-inch lathe, two 12-inch speed lathes, four trimmers and a band saw. The machines will not be driven from wall motors, shafts and belting, as ordinarily, but each is arranged for direct connection to its individual motor. The 20 and 12-inch lathes have variable speed headstock motors and suitable controllers.

Heating and Ventilating

For the use of the men employed in the foundry, there are individual steel lockers of the type manufactured by the Edward Darby & Sons Co., Philadelphia, and the mezzanine floor includes a large, well-ventilated toilet room with closets, wash basins, etc.

The heating and ventilating system is exceptionally complete. Large gal-

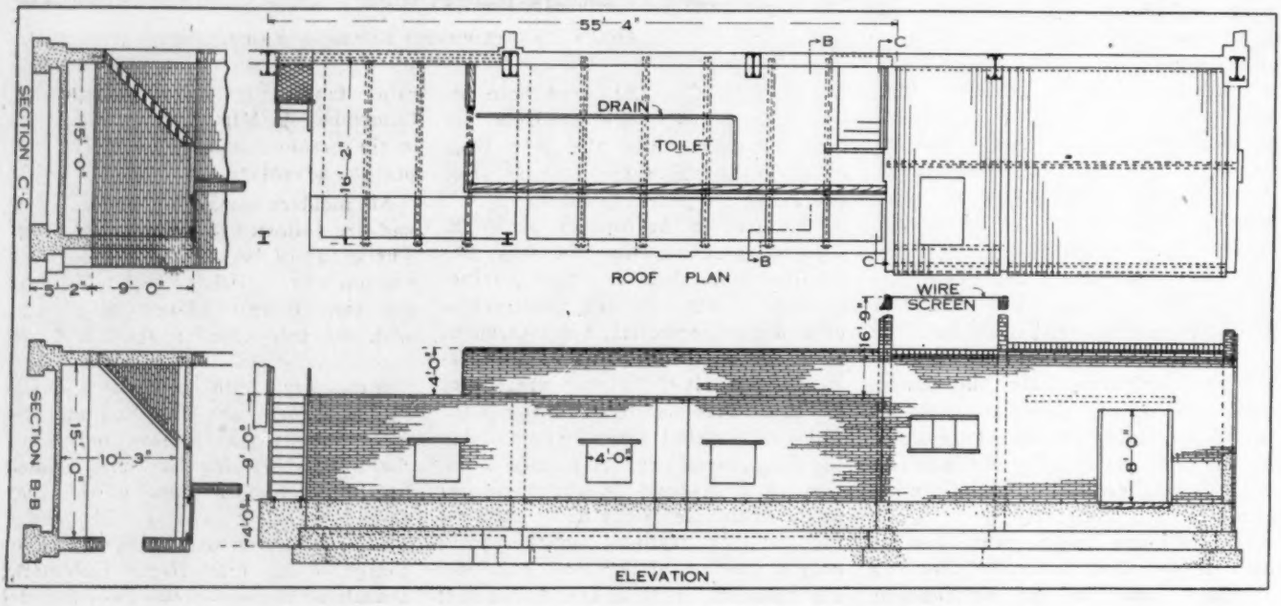


FIG. 7—ROOF PLAN, SECTION AND SIDE ELEVATION OF SAND BINS

vanized sheet flues extend along each wall, and from these, at frequent intervals, are bifurcated down-drops to 8 feet from the floor. A Sturtevant blower, located on the mezzanine floor, forces out cool air in summer and hot air in winter, through these flues and down-drops, into the central bay of the foundry, where it rises up through the side openings in the monitor, taking with it the dust and smoke of the plant. The system is also skillfully arranged with reference to isolated parts of the foundry, as in providing ample heat for the sand bins in winter to protect their contents from freezing. The provisions for lighting also are unusually good.

Along the length of the main bay, at intervals of about 20 feet, are Cooper-Hewitt quartz arc lights, and elsewhere 50 candlepower, 110-volt incandescent lamps have been placed.

Power Plant

Adjacent to the foundry and next to a slip where fuel can be unloaded directly from steamers is a modern powerhouse maintained by the company, from which electric current is distributed to the entire plant. There are four generating units, having an aggregate rating of 750 kilowatts with considerable overload capacity. The dynamos, which were built by the Canadian Westinghouse Co., are driven by Bellis & Morcom vertical compound engines. Steam is supplied from six vertical Wickes boilers placed over automatic smokeless furnaces built by the Murphy Iron Works, Detroit. The arrangement of these boiler units with Dutch oven settings enables coal to be brought in on tracks laid across the tops of the furnaces and dumped directly into the feed hoppers from the small cars used for this purpose. Water for the boilers is supplied by Blake and Buffalo steam pumps. A barometric condensing system has also been installed, to increase the economy of the engines, the circulating and vacuum pumps being of the Worthington Pump Co.'s type.

From the generating units the current, at 250 volts, passes to the buses of a 10-panel switchboard and is thence distributed to the 200-volt direct current motors in the shops, which are mainly Canadian Westinghouse, but also include many made by the Reliance Electric & Engineering Co., Cleveland, and Crocker-Wheeler Co., Ampere, N. J. Each shop, including the foundry, has its own feeder line, controlled from a separate panel in the switchboard. The voltage of the lighting system is also kept uniform by a balancer set, consisting of a 10-kilowatt generator and driving motor.

The compressed air for the foundry and shops is furnished on a very economical basis by two high-duty, two-stage steam-driven air compressors. One is a Bellis & Morcom vertical compressor of 2,000 cubic feet capacity; the other is a horizontal duplex compressor of 1,200 cubic feet capacity built by the Canadian Rand Drill Co.

In the layout of the foundry, shops and power plant the matter of protection from fire has received more than ordinary consideration. High pressure pipe lines extend throughout the works, with hydrants and coiled hose at frequent intervals. Adjoining the boiler room two fire pumps built by the Northern Mfg. Co. and the Canada Foundry Co., Ltd., have been installed, and these are available for throwing water into the pipe lines mentioned, within a few seconds after the alarm has been sounded.

FIG. 8—THE COVERED STORAGE YARD

The work in the foundry, under R. Agnew, foreman, does not vary materially from that of other engine-building plants. In the construction of a single locomotive, however, about 600 separate pattern parts, on an average, are involved. Hence great care has to be exercised to avoid any omissions or failures which would delay the final assembling. A feature of interest, at present, is the comparatively small size of the flasks used for the cylinder castings, which permit only a fraction of the sand wall usually allowed. This is due to the fact that in the old foundry the handling facilities originally installed were inadequate for loads beyond certain limits. Therefore, as the cylinders of locomotives became larger and larger, the weight of the sand rammed around a casting had to be kept down and the maximum size of the flasks could not be greatly increased. Accordingly, less and less sand was used in comparison with the dimensions of the pattern. In spite of this handicap, the number of failures has been very slight, so much so that in the new foundry the old flasks are still being used. Convenience and greater safety will eventually, however, dictate the use of heavier flasks, and for the largest work, the molding pits shown in the plan of the foundry will shortly be available. In handling molds with the crane, the precision of control afforded by the dynamic braking system of the Electric Controller & Mfg. Co. (referred to in the previous article) offers an important advantage.

All molders work nine hours a day and are followed by a pouring gang. The grade of labor, principally native Canadian or British, is high. Most of the men now employed have been with the company for years and are exceptionally skilled.

Altogether, with a modern well-equipped plant and the existing efficiency of its management and labor, the task of turning out one finished locomotive for each day in the year should be easily assured. The entire work of reconstruction has been in charge of the firm, Henry Goldmark, consulting engineers, 103 Park avenue, New York.

Design of Modern Open-Hearth Steel Furnaces

(*Continued from page* 502.)

some of his charge (steel and slag), to help along the next heat.

With reference to the third purpose for which the tilting furnace has been found of use, namely as an apparatus in which the continuous method of steel manufacture is carried out, the author has no hesitation in saying that without the tilting furnace the continuous process would never have been a commercial success, and the millions of tons now being made annually would not have been possible. The ease with which molten pig iron can be poured in, molten steel cast out in any desired quantity, and practically free from all slag, and the facility with which slag can be removed, free from all steel, renders this type of furnace indispensable for carrying out the continuous process. By its use any grade of pig iron (within the ordinary limits of silicon), with or without scrap, can be successfully converted into steel, and any grade of steel from the very softest to the hardest rail quality can be successfully made. From a single furnace of 150 to 200 tons capacity, with direct molten pig iron only, outputs of 1,200 to 1,500 tons per week of steel ingots are being obtained, and with desiliconized metal from a preliminary refining furnace, 1,800 to 2,000 tons per week; and if blown metal be used instead of pig iron, outputs up to 4,000 tons per week have been obtained from one furnace.

Size of Heats Tapped

An objection which has been made against the use of large tilting furnaces of 200 tons capacity has been that only 60 to 80 tons are taken out, although 200 tons are ready for tapping. To meet this objection the author has generally asked in reply, does not the fact that you have this tapping temperature, that you have this purity of composition of metal in the bath, and that you have a highly heated basic slag capable of doing work, all tend to quicken the purification of the incoming impure metal as well as to dilute the impurities in it, so that the continuous bath expedites the early part of the charge and thus more than outbalances any disadvantage that may accrue from retaining a part of the finished bath in reserve? The author has generally found that fair-minded opposition usually is ready to admit that this argument is a sound one, and that when looked at from a debit and credit point of view, the balance is on the credit side.

Another advantage which the use of the continuous bath offers, is that the melter can take off slag at any time that may suit his convenience, and when steels of great variation in composition are being made, such as from a steel with 0.05 per cent carbon to one of 0.70 per cent carbon, this is a very important point.

Again, furnaces can be tapped in better sequence according to the demands of the rolling mill, and if it is desired for any reason to hold back a furnace and not tap it when ready, sufficient metal can be run in to give additional weight to the bath, and so not lose output while still taking off the standard weight of heat in the ladle.

The manipulation of the slag in fixed furnaces when working liquid iron is admittedly not under such good control as when tilting furnaces are used. In fact, we have at one large continental works the peculiar feature of tapping a fixed furnace twice to obtain one heat of finished steel. This method of work must be due to the desire to get rid of the large volume of slag which is formed, unless there is some other advantage of which the author is ignorant, and upon which he would like further information.

The furnace is emptied of metal and slag, the hole is stopped, and the metal is returned again to the furnace from the casting ladle. It is true that oxide and lime are added to the furnace before the metal is returned, but they could be added with greater advantage to the surface of the metal if a tilting furnace were employed, and the slag only poured off leaving the metal in the furnace, where it would not be subjected to the cooling action of the atmosphere. The adding of large basic additions chills off the furnace, and in heating up again, accretions at times form on the bottom which grow and cause it to get out of shape. If a tilting furnace were employed with this method of work, no doubt part of the slag would be retained when tapping, and with it necessarily some metal, and the author believes better results would thereby be obtained than by tapping a fixed furnace twice for one product.

Rated Capacities of Furnaces

In Tables I and II are given the so-called rated capacities and dimensions of various furnaces, from which it will be noted that there is absolutely no fixed ratio between the rated capacity, the hearth areas, and the cubic areas of the regenerator chambers. The furnaces of 100 tons capacity and over, are all tilting furnaces using the Talbot process, and it will be seen that in their cases there is a fair agreement between them, but when we come to the fixed furnaces the whole problem is chaos.

On theoretical grounds one might expect a much higher temperature in the stack from these large tilting furnaces working the Talbot process, owing to the small cubic capacity of the chambers. The author was interested to ascertain, as nearly as possible, what this loss really was, and in Fig. 3 is given a chart of readings taken every five minutes over a period of 17 hours by a pyrometer of the temperature at the base of the stack of a furnace of 175 to 200 tons capacity working continuously. It will be noted that at many of the reversals the temperature increases, owing to gas passing the valve, which points to the fact that although the valves are arranged to cut off the supply of gas before reversal, the supply valve does not shut-down completely, so that short-circuiting occurs.

The average temperature found, including the high peaks at reversal over the 17 hours, is 472 degrees Cent. Omitting the high peaks due to reversal, the average temperature of the outgoing gases at the stack was 462 degrees Cent.

Modern Car Steel Requires Less Paint

In the early days of steel car construction, according to an authority on this subject, too much paint was applied to exterior and interior finishing to secure the desired surface. In many cases 14 coats were considered necessary, due to inferior assembling and the condition of the steel. This superfluous amount of material was the cause of cracking and peeling, which is now practically eliminated by superior steel and methods of construction that make it possible to get a surface with less coats and to rub closer to the steel.

Samuel Edwards, Pittsburgh, recently has been granted a patent on a flux for coating iron or steel with lead by the hot process. This flux consists of: (1) muriatic acid, 100 pounds, and zinc, 2½ pounds; and (2) muriatic acid, 100 pounds; aluminum, 1 pound, and sal-ammoniac, ½ pound. The zinc and aluminum are dissolved in the acid, and after the sal-ammoniac has been dissolved, the two solutions, (1) and (2), are mixed. The iron or steel to be coated with lead is first immersed in the flux so that the surface is practically coated, and then it is dipped in the molten lead to 600 degrees Fahr.

Heavy Buying of Southern Pig Iron Resumed

Leading Cast Iron Pipe Maker Takes Large Tonnage—
Concessions More Freely Made on Some Finished Materials

BY GEORGE SMART

As it is expected that the tariff law will soon be signed by the president, the iron trade is showing increased interest in its probable effect on the market. Information received in New York that an important metal merchant in England had bought 50,000 tons of Middlesbrough warrants was accepted as an indication that probably the iron would come to this side, as the buyer in past years has represented an American consumer. It has been figured out, however, that Middlesbrough No. 3 with duty free cannot be laid down at eastern ports at much, if any, below the prices of northern iron, and the delivered price would probably be higher than that of Alabama iron. However this may be, eastern buyers of pig iron, billets and sheet bars are showing a disposition to take advantage of the situation and some are using the prospect of foreign competition to induce the granting of concessions by American sellers. Much will depend upon conditions in foreign countries as to whether the new low tariff will have much effect in this country or not.

Pig Iron

The most active feature of the pig iron market has been the continued heavy buying of southern iron, especially by the leading cast iron pipe interest whose additional purchases are estimated to amount to about 50,000 tons for distribution at its various plants. Sales for consumption in the south alone, including pipe business, amounted to 46,000 tons. Pig iron stocks are declining in the south and the situation in that section is stronger.

Finished Material

In finished materials, there is no disguising the fact that some mills are getting very near to the end of their orders and consequently are becoming more anxious to take on new business. Unless considerable activity develops in the market, some sharp price cutting may be expected, in fact, already in various lines, low prices are being heard of with increasing frequency.

Plates and Shapes

Owing to the limited buying of cars, the plate market is quiet and sales are freely made at 1.40c, Pittsburgh. One eastern company is, however, booking orders up to its capacity. The sheet market continues ragged and some very low prices are being made. Buying is in moderate volume. In structural material, contracting for the past week has been rather light and quotations are irregular. The Republic Iron & Steel Co. announces that it is now quoting 1.40c, Pittsburgh, on the limited sizes of structural material which it makes. In spite of the decrease in new business, the demand for delivery on contracts is very strong. The American Bridge Co. has taken 1,485 tons for the Panama-Pacific Exposition fine arts building, and 1,600 tons for a bridge at Lafayette, Ind. Preliminary estimates of the tonnage which will be required by the new Union station, Cleveland, place the requirement at about 3,000 tons, but as extensive track elevation work is to be done in connection with the new terminal, it is expected that a considerable additional tonnage will be required. New shops for the Crane Co., Chicago, will require about 3,000 tons. Bids have been received on the Lincoln Memorial, at Washington, but final action has not been taken.

Bars

The price of 1.40c on steel bars is being rigidly adhered to; in fact, this seems to be about the strongest material in finished lines. There is much irregularity in bar iron, but some improvement in demand.

Railroad Buying

Railroad buying is still light, but there is reason for believing that an improvement will set in at an early date. The New York Central has distributed 2,000 tons of structural work, the Lehigh Valley is taking bids on 1,200 to 1,500 tons and the Boston & Albany is in the market for 1,000 tons. Another section of the New York subway, calling for 6,000 to 7,000 tons, is up for bids. The Pullman Co. has divided an order for 300 passenger cars for the New York Central lines among a number of car builders.

Scrap

With the exception of a large purchase of heavy steel by a Coatesville, Pa., steel plant, at $12, delivered, no important sales of scrap are reported and in some sections of the country the old material market is extremely quiet with a tendency toward dullness.

Coke

The $2.50 price on furnace coke for prompt delivery continues to be shaded, but usually not more than 15 cents. The market is quiet at present and will be until buying for October delivery sets in. The contract price is being rigidly adhered to. Foundry prices are firm.

Pittsburgh Consumers Are Cautious

And Mills Are Becoming More Anxious for Orders —Pig Iron Extremely Dull—Sharp Cutting in Sheets

BY C. F. WILLIAMS

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg.,
Pittsburgh, Sept. 16.

The first half of September failed to develop any activity in the iron and steel trade, and present conditions are very much like those existing in July and August. Manufacturers are hopeful that a buying movement will be enjoyed before the end of the month, and some of them will need business by that time in order to keep mills operating at present capacity. Consumers are content with buying small lots for immediate needs. The pig iron market is quiet, but unchanged. Connellsville furnace coke, which has sold at $2.25 for prompt delivery, is not in great demand, and will not experience activity until buying for October begins.

Pig Iron.—The market is lifeless and no inquiries of importance are before the trade. In the absence of sales, it is difficult to obtain much of an insight into prices, although dealers are refusing to offer iron at less than current quotations. Some inquiry for next year's foundry has come out, but no attempt has been made to buy steel making grades for delivery after Jan. 1. The Allegheny Steel Co. is tentatively negotiating for 3,000 tons of October basic and another inquiry involves 1,000 tons. Leading sellers are asking $14.50, valley, for basic, but sales have not been made above $14.25. Bessemer is well pegged at $15.75, and foundry and malleable are strong at $14, valley. The stack of the Kittanning Iron & Steel Mfg. Co., operating on basic, was blown out for repairs last week.

Ferro Alloys.—Lower grades of ferro silicon are obtainable at about $2 a ton under what have been prevailing nominal quotations, but 50 per cent material is firm at $75, Pittsburgh. Ferro manganese is not considered above $55, seaboard.

Plates and Shapes.—The market is quiet and many of the mills can see the end of their tonnage for future delivery. Price conditions are no better, and despite the fact that some leading mills are refusing to shade 1.45c, 1.40c quotations appear more frequent. Inquiries for small lots of prompt material are numerous, but consumers show no disposition to cover future needs, and railways are not figuring in the market to any great extent.

Sheets.—Some irregularity continues to feature the sheet market, and lower quotations have come out on all products. Galvanized sheets have sold at 3.15c, black at 2.10c, and blue annealed at 1.60c, for base gages, showing declines of $7, $5 and $2, respectively, from the high levels of a few months ago. Some makers are refusing to shade maximum quotations, however. Mills continue to be driven at practically maximu mcapacity, but deliveries have greatly improved, and prompt material can be had without difficulty.

Rails and Track Material.—Until buying for 1914 becomes more general, mills manufacturing rails and track material will not experience much activity. There has been some supplemental buying of standard sections, and demand for light rails is fairly heavy. Leading makers of light rails are holding prices firmly, but it is understood that concessions have been offered by mills not usually figuring in that department. Spikes, track bolts and angle bars are quiet but unchanged in price.

Billets and Sheet Bars.—Leading Pittsburgh and Youngstown makers have not yet shaded $25, mill, for billets and $26, mill, for sheet bars, but small tonnages of open-hearth sheet bars are obtainable at $25.50, mill, from some of the smaller mills in this district. Consumers will not require additional material until the latter part of the year.

Hoops and Bands.—Heaviest consumers of hoops have covered needs, and it no longer is possible to shade 1.60c, according to leading makers. Demand is light. Bands are firm at 1.40c.

Iron and Steel Bars.—Iron bars continue to reflect weakness and have sold, in several instances, as low as 1.50c, although it is claimed the general market is not below 1.55c. Steel bars are firm at 1.40c and are considered stronger than plates or shapes, but are quiet so far as new buying is concerned. Shafting offers no new developments.

Muck Bar.—The proposed $7-a-ton wage rate of United Sons of Vulcan has not been accepted by leading mills in this district. Muck bar is nominally quoted at $31, Pittsburgh.

Bolts, Nuts and Rivets.—Some manufacturers still have enough orders to keep plants busy 60 days, and conditions are said to be stronger than a week or two ago.

Iron and Steel Pipe.—Orders for 20 miles of 8-inch steel pipe and about 900 tons of tubing and casing, all for Ohio shipment, have been placed with mills in this district. Demand for lap weld material continues heavy and some mills have enough tonnage to operate furnaces at maximum capacity until the end of the year.

Boiler Tubes.—Specifying continues heavy, and some new orders are being received. No reports of irregularity are heard.

Tin Plate.—Small tonnages of tin plate for prompt delivery have sold at $3.50 for base size boxes, although the $3.60 price continues to be obtained in many instances. Buying for next year's requirements has not yet begun, and no activity is expected until next month. Several mills appear anxious to take additional tonnage for quick delivery.

Wire.—Leading mills in this district are refusing to shade 1.65c for nails, but have been besieged with requests for lower prices ever since rumors of concessions were heard a week ago. Considerable tonnage has been sold at that figure, and specifications are heavier.

Wire Rods.—There is no change in the situation for wire rods, which are quoted at a spread from $27.50 to $28, Pittsburgh, for either Bessemer or open-hearth steel grades.

Coke.—Standard Connellsville coke for prompt delivery is quotable at a range from $2.25 to $2.50, ovens, although some operators are refusing to shade the maximum figure. The market at present is decidedly dull and no activity is expected until consumers cover October needs. According to frequent expressions, some grades of blast furnace fuel will be obtainable at the present minimum figure next month. Foundry coke is quiet but unchanged. The Connellsville *Courier* for the week ending Sept. 6, says production was 469,459 tons, a decrease of 33,571 tons compared with the week before.

Old Material.—The market continues quiet, and middlemen do not expect to see improvement until greater activity is reflected by the finished lines. Heavy melting steel is being held at $12.50, with small lots bringing $12.75. Some of the material offered by railways recently brought more than $12.50, direct from consumers. Other grades are unchanged.

Western Conditions Are Improving

But the Pig Iron Market at Chicago is Dead—Increase in Sales of Bar Iron—More Rails for the Nickel Plate

BY H. COLE ESTEP

Office of THE IRON TRADE REVIEW,
1521-23 Lytton Bldg.,
Chicago, Sept, 16.

Conditions show some improvement in the west. The better feeling is not confined to any one class, but apparently is shared equally by the steel makers and the consumers. The former are pleased with an appreciable gain in specifications coupled with some growth in new business, while the latter are encouraged by reports received from retailers and by an easier money situation and good crops. The general price situation remains unchanged. Buyers do not seem eager to force quotations to lower levels, realizing that such action would only result in a necessity for price reductions on their finished products. The scrap market continues weak and quotations on several important commodities are lower.

Pig Iron.—The second week in September failed to maintain the pace set by its predecessor. Activity has practically ceased. Inquiry is light and sales during the past several days have been few and far between. On the other hand, shipments are going forward steadily and there is no accumulation of iron in the furnace yards. The present dull spell does not indicate any unhealthy condition in the pig iron market. Almost all consumers are covered for their current needs, and only a few manufacturers are willing seriously to consider their 1914 requirements. There is evidence, however, that this subject will soon be taken up, and it is not improbable that in about 30 days an active buying movement for next year's delivery will be under way. There is nothing new in the price situation. Southern iron remains firm at $11, Birmingham, for this year, with the furnaces asking $11.25 for the first quarter and $11.50 for the first half. Charcoal iron continues weak, although sales recently have been insufficient thoroughly to test the situation.

Merchant Bars.—The lower prices established on bar iron have apparently had a rejuvenating effect and the principal makers report an appreciable increase in sales during the past 10 days. The mills are also encouraged to note that in many cases orders for new tonnage are accompanied by liberal specifications for immediate shipment, indicating that the buyers have actual need for the material at the present time. Although the iron mills are admittedly in somewhat better shape, none of them are willing to test the situation to the extent of asking higher prices. There has been also a liberal increase in specifications for steel bars against existing agricultural contracts. There is some further irregularity in shafting, although warehouse prices remain unchanged.

Plates and Structurals.—There is no evidence in this territory of structural transactions on a lower basis than 1.75c, Pittsburgh, also there are no new developments in the plate situation; the going price remains at 1.40c, Pittsburgh, or 1.58c, Chicago. The lower prices quoted on plates for mill delivery coupled with promises of early shipment have had a dampening effect on the warehouse demand for both plates and shapes. Although no new large contracts are pending, most of the fabricators in the Chicago district are well supplied with work. Only one or two companies are operating their shops at less than capacity. The mills are running full and early deliveries are daily becoming easier to obtain.

Rails and Track Fastenings.—The Nickel Plate has ordered 5,000 tons of standard rails from the Lackawanna Steel Co. in addition to 5,500 tons placed with the Illinois Steel Co., as reported last week. It is believed in the west that the New York Central order will be placed in the near future. A considerable portion of this will be rolled at Gary and South Chicago. There is comparatively little activity in track fastenings and prices on spikes and bolts are soft. Fair orders for light rails are reported.

Bolts, Nuts and Rivets.—The rivet and bolt plants in this district are operating at considerably less than their full capacity. The new plant of the Champion Rivet Co. has not yet been started. Business is light and quotations remain irregular. Fairly good specifications are being received from the agricultural interests, and this is one of the encouraging features of an otherwise listless situation.

Sheets.—The continued irregularity in the quotations on open hearth sheet bars is detrimentally affecting the sheet business in the west as well as in the east. Buyers are curtailing their purchases to their immediate requirements and will undoubtedly continue to pursue this policy until they are satisfied that the underlying conditions in the market are more stable. The western mills continue to operate at practically full capacity. There are some reports of quotations for mill shipment lower than 3.20c, Pittsburgh, for No. 28 galvanized, and 2.15c for the same gage of black sheets.

Wire Products.—Orders for fencing, nails and manufacturers' wire show considerable improvement and the reports regarding irregular prices which were in circulation 10 days ago have died out. Apparently the market is well established on a basis of 1.65c, Pittsburgh, for nails, and 1.45c for plain wire. There have been rumors of a general advance to take place about Oct. 1 with the object of stimulating specifications at the present price level. Some of the larger interests, however, are understood to be opposed to any steps in this direction at the present time.

Cast Iron Pipe.—There was a slight improvement in the volume of business booked during the first half of September as compared with the corresponding period in August. The United States Cast Iron Pipe & Foundry Co. is low bidder on 1,300 tons at Madison, Wis., and also on 3,000 tons at Cleveland. Low quotations are frequently being made by the independent foundries in Alabama.

Merchant Pipe and Tubes.—Recent statistics covering building operations in Chicago during August show a 16-per cent falling off compared with August, 1912. This has curtailed the demand for house pipe. The western makers are operating their plants at capacity and have about 90 days' business on the books. There is a good outlet for both seamless and welded tubing. Boiler makers are specifying liberally.

Old Material.—The scrap market remains in the doldrums with little prospect for early relief. Dealers are making as much capital as possible out of the slightly better bar iron situation, but up to date the improvement has not been sufficient to have any real effect on old material prices. Lower quotations are being named on a number of items, including busheling, steel angle bars and steel car axles. The latter have dropped 75c a ton. Railroad offerings are light; in fact, if the carriers had as many lists out now as were in circulation earlier in the month, quotations would probably go still lower.

Cleveland Buyers Are Hesitating

In the Hope of Lower Prices for Finished Materials —Pig Iron Very Dull—Furnace Coke Bought at $2.35

BY GEORGE SMART

Office of THE IRON TRADE REVIEW,
Penton Bldg.,
Cleveland, Sept. 16.

Iron Ore.—While the ore trade is in better shape than it was a week ago, shippers are having considerable difficulty in keeping contract tonnage busy and some ore vessels are being diverted to the grain trade. The coal trade is at present lending very little support to the market and carriers are experiencing much delay in getting cargoes. The grain shippers are now maneuvering for tonnage for November loading and are offering 2½ cents on wheat. Considerable vessel capacity has been tied up for October loading at 2 cents and it is now clear that fancy rates will not obtain in the grain trade this year as they did during the closing months of last year.

Ore shipments during September will probably not reach the 8,000,000-ton mark, as dispatch is slowing up all around and stages of water are falling. The movement will in all probability, however, exceed 7,000,000 tons.

Pig Iron.—The pig iron market has been extremely dull during the past week. Inquiry has disappeared almost entirely and there is very little buying. The heavy buying which was enjoyed a year ago, when some of the companies sold the heaviest tonnages in their history, is now recalled and a genuine buying movement may set in within the next few weeks, but at present there are no indications that it will.

Coke.—The purchase of 5,000 tons of standard furnace coke by a Cleveland firm for September delivery at $2.25, ovens, as reported last week, has no connection with another purchase of 5,000 tons by another Cleveland company of coke which was not strictly standard. There has since been some buying of furnace coke by still another Cleveland firm at $2.35, ovens. The foundry coke market has not changed with $3 the minimum quotation for either prompt delivery or on contract.

Finished Material.—The market has been characterized by more frequent reports of low prices on plates, shapes and sheets and 1.40c, Pittsburgh, has been done on lots of less than 100 tons of plates. In fact, in competition, no one expects to get more than 1.40c on plates. The sheet market continues very ragged. In structural material, there is insistent demand for deliveries and the leading interest has difficulty in satisfying its customers. The preliminary estimate of the architect of the new union depot is that about 3,000 tons of shapes will be required for the depot proper. As it is estimated that the track elevation and other work connected with the new terminal will cost $5,000,000 in addition to the $12,000,000 to be expended for the depot proper, probably a considerable additional tonnage of shapes and reinforcing bars will be required. The shops of the Nickel Plate railroad, at Stony Island, near Chicago, destroyed by fire a few days ago, are to be rebuilt and will require several hundred tons of steel. There is a good demand for wire fencing and prices on wire products are well maintained. The contract for 200 tons of sheet piling for the Milton dam, at Youngstown, is about to be let. In spite of the better deliveries given by some mills, buyers find it difficult to get all sizes promptly and the warehouses are enjoying a very good business.

With the orders on the mill books constantly decreasing and the anxiety for orders constantly growing greater, the probability for lower prices is more pronounced and it is evident that many buyers are postponing the placing of orders in the hope that they will obtain concessions at a not far distant date.

Old Materials.—The scrap market took a turn for the worse during the past week, owing to the lightness of the demand in this district. The market is oversupplied with nearly all grades, and prices have suffered as a result. One of the two large consumers of heavy steel in this district continues out of the market, while the other is offering only $10.75. We quote $10.75 to $11.25, a reduction of 50 cents from last week. Machine shop turnings are also weaker, having dropped 50 cents to $4 to $4.50.

Get-Together Meeting.—The Chicago Foundrymen's Club will hold its first meeting, following the summer vacation, Saturday evening, Sept. 20, at the Hotel Sherman. This meeting will be in the nature of a "get-together" affair after the three months of recess. The usual buffet luncheon will be served.

LIMITED ORDERS

For Pig Iron in the St. Louis District —Prices Firm.

BY E. C. ERWIN

Office of THE IRON TRADE REVIEW,
St. Louis, Sept. 16.

Pig Iron.—About the only real business in sight on the pig iron horizon in St. Louis is an inquiry for 2,000 tons of northern basic. Sales last week were limited to a small tonnage, made up of small lots, the largest of which was one for 900 tons of southern No. 2 and another for 500 tons of the same grade. Southern No. 2 is firm at $11 to $11.50 for this year, with dealers refusing to quote for the first quarter. Northern quotations are unchanged.

Coke.—There is very little demand for coke, and furnace grades have softened to $2.25 to $2.35. Foundry coke is firm at $2.90 to $3, according to shipment.

Old Material.—Prices of scrap iron have not changed from last week, and there are no lists out today. Sales last week amounted to a considerable tonnage, especially for cast iron and steel. Relayers continue in good demand, and the supply is short.

DANIELS TALKS

About His Achievements—Asks For Costs of Armor Plate.

Washington, Sept. 17. (By wire.)—Claiming more than $500,000 already saved to the government through competition on contracts for materials for battleship No. 39, Secretary Daniels has announced that he had notified the Midvale, Carnegie and Bethlehem steel companies that he would not accept their bids, all identical, for heavy armor plate for this vessel unless the companies show the cost of production figures to justify prices. Secretary Daniels says the solution of the problem to get heavy armor at right prices is the construction of a government plant and he thinks congress will support him.

L. R. Lemoine, president of the United States Cast Iron Pipe & Foundry Co., has gone for an extended trip to various Pacific coast points.

Southern Pig Iron Appears Stronger

As Viewed From Cincinnati—Some Alabama Furnaces Advance Quotations — Spot Pocahontas Furnace Coke Reduced

BY S. G. BACKMAN

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, Sept. 16.

Pig Iron.—The southern situation is a little stronger, due perhaps, to a large extent, to the better feeling that is prevalent throughout this market in regard to a generally anticipated advance in prices. Several Alabama furnaces have notified the market that $11.50, Birmingham basis, is now the minimum quotation on strictly No. 2 foundry iron for this year, and while they are not anxious to sell beyond next December, they will accept $12, Birmingham, for the first quarter, and in some cases, for the first half. Other furnaces in both Tennessee and Alabama, however, are still on the basis of $11, Birmingham, for last quarter shipment, and some will take $11.25 for the first quarter, and $11.50 for the first half of next year. Others are holding at $11.50, Birmingham, for any delivery during the first half. Thus the market is from $11 to $11.50, Birmingham basis, with indications of a general advance to the higher figure before the end of the present year. This strength is not attributed to an increase in transactions, which, on the contrary, are still very few, but to the fact that several furnaces have contracted for about all the iron they desire to sell at this time of the year. No sales have as yet been reported made at $11.50, Birmingham, for the last quarter, but it is expected that buyers desiring certain brands of iron will contract at this price within a few days.

The southern Ohio situation is unchanged, and $14, Ironton, is the quotation for No. 2 foundry iron that is being adhered to by the furnaces in that territory. Offers of less by certain melters, who desire to close for fair tonnages, have been steadily refused up to the present time.

The recent purchase of the American Rolling Mill Co., Middletown, O., of about 50,000 tons of basic iron, has not been felt much in this territory, as most of this business is reported to have been taken by central Ohio furnaces. Prices on this sale are also reported to have been slightly below the general market quotations, as were also those on 2,500 tons of northern and 2,500 tons of southern foundry iron recently taken by the Globe Stove Co., at Kokomo, Ind. Both contracts call for delivery into next year. The Platt Iron Works, Dayton, O., has made a general offer to the trade on its inquiry for 2,500 tons, divided between northern and southern grades, but the prices are so low that it is not likely this company can close at these figures, which are from 50 cents to 90 cents below the general quotations. Inquiries and sales continue generally light and few, with no improvement in this line from that of last week.

Coke.—The spot price of Pocahontas furnace coke has been reduced to from $2.35 to $2.50 per ton, ovens, but the contract price is unchanged. This is due to the fact that a number of furnaces have been out of blast for some time, thereby reducing the consumption of 48-hour coke proportionately, and also because the amount of coal mined within the past few weeks has been heavy, necessitating the immediate removal of some of the coke from the ovens in order that some of the surplus coal can be turned into coke. This condition, however, is probably only temporary. The prices on foundry coke in this district are unchanged for either delivery. A leading Wise county interest had advanced its prices on foundry coke to $3.50 per ton, ovens, on one brand, and $3.75 per ton, ovens, on another brand, with furnace coke prices about 25 cents below those on foundry coke. These latter figures, however, are considerably above the general quotations, which are from $2.75 to $3.20 per ton, ovens, for foundry coke. Prices on the other fields are unchanged and firm. The situation as a whole is strong, with no indications of weakening in the near future.

Finished Material.—The local sheet mill is enjoying a good business and prices, though above those in adjoining eastern territories, are holding well. Specifications on old orders are coming in fast, and new orders are equally as heavy. Indications are that a good fall business will result. The mill is from six to eight weeks behind on deliveries, and apparently this condition will continue for some time. Most of the orders are coming from jobbers in this and western territories, who are anxious to secure fall requirements. Prices prevailing in this district are unchanged and strong at from 3.20c to 3.30c on galvanized sheets, and from 2.20c to 2.25c on black sheets, both 28 gage and both Pittsburgh basis.

There is a better feeling among the warehouse trade, following the settlement of the local teamsters' strike, and a large part of business recently has been to catch up on old orders that accumulated during the strike. New orders have not fallen off any, and the situation as a whole appears to have been entirely cleared up. Business, however, is not brisk, but only fairly active. Warehouse prices on all forms of shafting have been reduced recently from 50 per cent off to 53 per cent off, Cincinnati. The demand appears to be equally divided among the materials carried in stock, with concrete reinforcing bars and steel piling probably selling slightly better than the others.

Old Material. — Although a better feeling has prevailed in the scrap iron market since the settlement of the iron molders' and teamsters' strikes in this city, several weeks ago, the condition as a whole does not appear to have changed either in regard to a better buying movement, or to a change in prices. Dealers are naturally somewhat busy catching up on old orders that accumulated during the teamsters' strike, but new business has not shown any increase. A slightly better demand for No. 1 machine cast has been noticed recently, but this has not been enough to warrant an advance. Prices are therefore quoted as unchanged, more because of the lack of transactions upon which they could be based, than anything else. There is undoubtedly a large surplus of scrap available in comparisbn with the consumption for some time to come, which indicates that prices will not be advanced much, if any, during the remainder of the year.

The Domhoff & Joyce Co., with offices located at Cincinnati, Chicago, St. Louis, Indianapolis and Cleveland, has been appointed exclusive selling agent in the St. Louis territory for the Roane Iron Co.'s Rockwood iron, manufactured at Rockwood, Tenn. Effective Oct. 1, the Domhoff & Joyce Co. will handle the entire territory for Rockwood iron west of the Allegheny mountains.

Lockwood, Greene & Co., architects and engineers for industrial plants, 60 Federal street, Boston, announce the establishment of a Canadian office under the name of Lockwood, Greene & Co. of Canada, Ltd., with headquarters in the McGill building, Montreal.

Good Sales of Southern Pig Iron

Largely for Use in the South, Followed by Advances in Quotations—Few Producers Able to Sell for This Year's Delivery

BY W. B. NEAL

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Sept. 16.

Pig Iron.—The market has developed a more optimistic feeling among the producers during the past week than had existed for some time. The large tonnage booked during the week has forced the price to $11.50 per ton for No. 2 foundry at the furnace for delivery during the fourth quarter. One large interest sold during the week 1,000 tons for fourth quarter delivery at $11.50 per ton for No. 2 foundry. However, before the advance was announced, there had been an aggregated tonnage booked of something like 46,000, sold mostly for use by southern consumers. The tonnages entered were in lots of 18,000, 15,000 and 10,000; also 1,000 tons in lots of 100 to 250 tons; also carload and 100-ton lots aggregating 1,000 tons. Aside from the heavy sales made, inquiries are numerous, and other large specifications are now pending. Most of the producing interests have sold up into the fourth quarter and are not now in position to enter any more tonnage for the remainder of the year. At the present time, there is piled on the furnace yards of the district less than one month's make of foundry iron, or something like 130,000 tons. The bulk of this tonnage is carried by not more than two of the large interests, and there appears to be no disposition on their part to push the sale of same, it being thought that within a short time their wisdom will be borne out in its increased value by reason of advances in price. As far as can be ascertained from the heads of the sales departments of the iron companies, no contracts have been closed for iron to be delivered beyond the last quarter of this year. The effort is being made by furnaces to fill contracts, and a considerable tonnage is moving as fast as cars are received and labor is available. At present there are only 21 furnace stacks in blast in the district, 13 being on foundry iron and eight on basic iron. It is not likely that any additional stacks will be blown in during the current year. It has been reported that the large new stack of the Woodward Iron Co. will be blown in some time in October, but the Woodward company states that it will not be blown in before Jan. 1, 1914.

Cast Iron Pipe.—The several plants are all in operation and shipments continue to go forward, but not in such volume as is in evidence when orders of large proportions are being filled. The plants are all supplying themselves with large stocks of raw material and everything looks as if orders of large volume were contemplated.

Old Material.—A much better feeling exists with the dealers in scrap, and inquiries for same are more numerous and sales are being made of larger volume. Shipments are now going forward with more regularity than for some months. The stocks are being increased extensively. Prices have not been advanced as yet, but a buying movement is expected very soon.

PRESSURE FOR DELIVERIES

Is Feature of Buffalo Market—Prices Are Firmer.

BY FRANK R. DOLBEE

Office of THE IRON TRADE REVIEW,
Buffalo, Sept. 16.

Pig Iron.—Pressure on the furnaces of the district for immediate delivery on iron under contract, up to the full capacity of the operating stacks, coupled with a fair sized, unsatisfied inquiry, and a placement amounting to fully 25,000 tons, in foundry and other grades, has caused the market to become stronger in the past week. Prices have not been advanced again, but they are firmer than they were a week ago. Some of the interests are demanding and booking tonnages on the maximum of the level established last week. All the interests say that the demand for iron is both persistent and insistent from users in all parts of the district, who need material under contract for immediate melting. Some foundries that have been ordering out single carloads are now asking for two; those which have been getting deliveries in two-car lots have increased to three and five, and there is one instance where one melter, who was taking out two cars a week, now insists that the furnace ship ten cars each week. This iron is going into immediate consumption and not for stocking purposes.

The week's placement was in scattered orders for cars and up to 100 and 500-ton lots, with one order for 4,000 tons, all at schedule prices, for immediate delivery and over the remainder of the year. The major share of the booking was in foundry grades, some malleable and a smaller portion of charcoal irons. A decidedly better sentiment prevails throughout the entire district.

Finished Material.—The mills and agencies of the district report that the market situation is stronger than it has been in the past month, with the possible exception of wire and wire products. At the same time, one of the interests has been booking considerable wire and wire nail orders at 1.45c and 1.65c base, the prevailing prices, and without concessions to customers who are accustomed to placing their requirements at good prices. In bars, shapes and plates, hoops and bands, the demand is reported good, and the opening of the fall season has brought out a considerable tonnage in structural, made up of widely scattered nominal lots. The fabricators all report more activity than usual, putting them in shape to keep up the operation of their plants on orders booked some months ahead, and to maintain prices.

Old Material.—The scrap market is slow in following up the improvement in the pig iron situation; in fact, the yards are still looking for the revival of activity. Dealers are confident that prices will stiffen in the near future, and are therefore holding to the schedules which have prevailed for the past few weeks, despite the fact that trading is light in all of the lines except in cast iron borings and steel turnings, and this demand is largely from the valley. The principal interest continues to be out of the market on heavy melting steel and the Canadian market for old car wheels is still off. The general impression is current that the bottom has been reached in scrap and that with the arrival of the usual fall activity, prices will advance rather than decline.

A new record for speedy concrete construction has been established in the erection of the foundation for the new foundry building of the National Brake & Electric Co., at Milwaukee. The Wisconsin Cement & Construction Co., of Milwaukee, placed 86,400 cubic feet of concrete in exactly 29 days, and the structural steel contractor was able to start his work within a month of the time ground was broken.

Eastern Pig Iron Market Strengthening

Demand for This Year's Requirements Continues—Some Investigations in Regard to Cost of Foreign Products

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
611 Bulletin Bldg.,
Philadelphia, Sept. 16.

The placing of the tariff bill in its final stage has revived attention toward this factor in the eastern market, where the effects of this measure in stimulating foreign competition are expected to be most directly felt. The prospect of free billets and pig iron is causing some buyers to carefully sound out the possibility of importing material. Some eastern makers of semi-finished steel are inclined to expect severe results from foreign competition in this material. A good movement in pig iron continues to elevate the prices of eastern furnaces. The finished material market lacks briskness and prices show easiness. One large purchase of scrap is reported.

Pig Iron.—Buyers in eastern Pennsylvania are keeping up a liberal demand to cover requirements for the rest of the year, and there is a sprinkling of orders running beyond Jan. 1. This steady buying is giving the market a soundness it has not shown for some months, and prices are undergoing constant strengthening. Low silicon iron still leads in tonnage. Eastern furnace banks have been swept pretty clean by recent heavy sales of forge and pipe iron and prices are rising in these grades. A Schuylkill Valley rolling mill bought 5,000 to 6,000 tons of standard northern forge at $15, delivered, which now seems the market's minimum with some makers, as reported, asking $15.25, delivered. The Bristol, Pa., pipe maker, who is still inquiring for 5,000 tons of forge and No. 3 for November-December, is expected to buy at $15.25, delivered.

The United States Cast Iron Pipe & Foundry Co. has bought additional low grade tonnage for local, western and southern plants. Another pipe maker in the Delaware river district has been interesting himself in the possibility of bringing in English iron, with free duty. At present, prices abroad it is figured, however, that No. 3 Middlesbrough cannot be laid down much under $15.75, delivered along the Delaware river, or practically on the same basis as northern No. 2X today. The strong market in low grade iron is expected to firm up basic. A western New Jersey buyer in the week, however, was able to do $15, delivered, on 3,000 tons for shipment this year, or the same basis as previous sales. Later a Harrisburg steel maker took 2,000 tons for this year at about $15.40, delivered, or $14.25 at the seller's furnace. This sale represents some advance over and above the higher rate. Considerable miscellaneous buying is being done in foundry iron on an average of about $16, Philadelphia, for No. 2X. A few sellers will still do $15.80 to $15.90, and some report as high as $16.75 obtained on small lots. The Pennsylvania railroad is still negotiating for 4,800 to 9,600 tons of coke and charcoal iron from last quarter. Virginia iron for this year is still offered at $13, furnace, for No. 2X. Some sellers report fair bookings at $13.25. The Virginia Iron, Coal & Coke Co. announces its first quarter schedule as $13.50, furnace, for No. 2X, $13.25 for No. 2 plain and $13 for lower grades. The Southern railroad inquiry for 1,500 tons of foundry for Lenoir City, Tenn., has closed with Alabama and Tennessee makers. Low phosphorus sales are light.

Iron and Steel Bars.—Specifications for steel bars from the implement trade in this district are slow. From other consumers they are fair. New business is light. A Lebanon buyer has been closing for several hundred tons of nut and bolt stock. Base prices remain firm at 1.40c, Pittsburgh, but extras are not always maintained. The common grades of bar iron continue to sell around 1.25c, mill, but other brands bring 1.35c, mill, or more.

Plates.—One eastern maker reports it is maintaining a record of bookings in excess of capacity, the tonnage coming from many sources largely in small lots. The experience of other mills is less favorable. The market remains 1.55c to 1.60c, Philadelphia, and 1.40c to 1.45c, Pittsburgh. Small lots usually bring the full price, but buyers with sizable orders have no great difficulty to obtain the inside level. A heavy tonnage for prospective boat wants remains in sight. A riveted pipe line for Whitney, N. C., to require 3,000 tons of plates, has been abandoned and different material will be used.

Structural Material.—Comparatively quiet conditions mark the eastern structural market. New business is only fair. Order books of the mills have been marked off, so that there is more anxiety for tonnage, and prices have become quite irregular. Usually 1.40c, Pittsburgh, or 1.55c, Philadelphia, is the minimum. Small orders prevail upon which 1.45c, Pittsburgh rules.

Sheets.—Eastern sheet makers are taking tonnage up to capacity for early needs. Formal buying is absent. The 1.60c, Pittsburgh, price reported on No. 10 blue annealed has not reached the east, and 1.65c, Pittsburgh, or 1.80c, Philadelphia, represents the market.

Semi-Finished Steel.—More talk of the probability of foreign steel becoming a market factor within the seaboard zone has been revived by the passage of the senate bill free-listing semi-finished material. At least one large eastern Pennsylvania buyer of billets is holding off purchases from domestic mills until it has thoroughly canvassed the foreign steel market under the new tariff. Some eastern Pennsylvania steel makers are apprehensive over the outlook, stating that on the basis of prices now quoted abroad, foreign mills can undersell them today $1 to $2 a ton on billets and sheet bars. Interesting developments in tidewater territory are promised when the new tariff prevails. The market remains quiet and inclines towards price softness. Eastern makers of rolling billets quote about $26, delivered this territory, but would do less. A small lot of small billets went at $25, Pittsburgh. An inquiry for 2,500 tons of billets for early shipment is current.

Old Material.—The practical dead balance in the heavy melting steel market has been broken by the closing of purchases aggregating probably 15,000 tons for shipment over the remainder of the year by a leading Coatesville consumer. The prices ranged from $11.50 for the small to $12, delivered, for the largest lots. One report is that over $12 was paid in some cases, but this lacks confirmation. Other steel makers offer but $11.50, delivered. Rerolling rails have sold at $15, delivered. Sales of steel shafting at $17.50, delivered, are noted. The market, while of continued better tone, shows moderate volume.

V. de Ysassi, representing Sata & Aznar, London, iron ore merchants and operators, has arrived at Philadelphia to look over the eastern ore situation. He was formerly the representative of his firm in this country.

Pig Iron Prices in New York Firm

But Tonnage Booked is Smaller—Only Moderate Business in Finished Materials

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg.,
New York, Sept. 16.

Iron Ore.—A representative of the leading Spanish ore seller has arrived in this country to look over the eastern ore situation. There seems little opportunity for additional sales of foreign or other ores at this time, except possibly at sharp price concessions. The market is very quiet.

Pig Iron.—The past week in the metropolitan pig iron market has shown up less heavily in the tonnage booked and inquiries are slower, indicating that there is not a great amount of iron for this year's requirements yet to be purchased. In scattered cases, consumers are inquiring or closing through first quarter and one negotiation for first half remains open. Usually makers are able to obtain some price advance for first quarter over last quarter. Prices show firmness and still rise slowly. The tidewater market for No. 2X is now on a minimum of $16.00, delivered, as different Buffalo interests are now holding at $14.25 to $14.50, furnace. Some of them have announced their schedule for the year as $14.50 for No. 2X, and $14.25 for lower grades. Eastern Pennsylvania irons are quoted at from $16.00 to as high as $16.75, tidewater, and Central Pennsylvania brands around $16.30, tidewater. Virginia iron remains at from $16.10 to $16.60, Jersey City.

A Newark buyer asks 1,000 tons of Nos. 2 plain and 3 for last and first quarter, and a Brooklyn melter 600 tons of 2.75 to 3 per cent foundry for last quarter. A stove maker still figures on 2,500 tons of southern iron for first half. A soil pipe maker has been inquiring for northern and southern grades, and has bought about 1,000 tons of the former. The Newport News Shipbuilding & Dry Dock Co. took about 1,000 tons of foundry from Virginia makers. The Crane Valve Co., Bridgeport, Conn., took 500 tons of malleable from Buffalo. Cast iron pipe makers continue active buyers. The United States Cast Iron Pipe & Foundry Co. is reported to have bought 15,000 to 20,000 tons additional for western and southern plants. The Sloss-Sheffield Steel & Iron Co. has advanced southern iron for this year to $11.50 and to $12 for first half. The sales of this maker the past two months have reached approximately 100,000 tons.

Ferro Alloys.—Some of the merchants who have been selling prompt ferro-manganese at concessions, now have cleaned up their supplies of this material, and in that respect, the market seems firmer. There are other merchants and speculative interests, however, who still look for lower prices and will accept orders below the quotations of direct sellers. It is not unlikely that as low as $54, seaboard, might be done on a large lot with such sellers. Few large lots are offered, however. Pending inquiry reaches about 1,500 tons, including one inquiry for 600 tons for a middle western consumer.

Plates.—With the car situation still very quiet, large orders for plates are few. There continues a fair miscellaneous business for early shipment and buyers have no difficulty in getting the deliveries they desire. On attractive orders, 1.40c, Pittsburgh, or 1.56c, New York, is going quite freely, but a good many small orders are still bringing 1.45c, Pittsburgh. Except in very exceptional cases, makers are unable to obtain full bookings.

Structural Material.—Quotations of 1.40c, Pittsburgh, or 1.56c, New York, on small angles above 3 inches, are now being made by some middle western mills in this territory. The market on such business as is moving, which is not large, is inclined toward a general 1.40c, Pittsburgh base, although a good many small lots are still bringing 1.45c. New business is only fair and none of the eastern mills are able to maintain full operations.

Cast Iron Pipe.—Lynn, Mass., is taking prices today on 6,500 tons of 4 to 36-inch pipe and specials. A contractor's letting for 2,200 tons of 6 to 20-inch pipe for Queens goes in tomorrow. A direct letting of about 800 tons of 6 to 8-inch pipe for Manhattan and Brooklyn, is scheduled for Sept. 26. The advertising for bids for the large tonnage of flexible joint pipe for the Catskill aqueduct line, has been deferred. The market shows a slackening in orders that usually comes at this period of the year. Eastern shops continue about 75 per cent active. Prices are irregular.

Iron and Steel Bars.—A large buyer in this district who has not fully contracted for last half, has been offering some attractive tonnages for that period around 1.37½c, Pittsburgh, but has been unable to obtain concessions. The market remains firm at 1.40c, Pittsburgh. Specifications show little change. Stone & Webster, Boston, are inquiring for 1,000 tons of reinforcing bars for buildings for the Massachusetts Institute of Technology, Boston. The movement in iron bars is not increasing. Prices remain from 1.25c to 1.35c, mill.

Old Material.—Outside of a large purchase of heavy steel by a Coatesville buyer, who paid $12, delivered, on tonnages, there have been no important developments in scrap. Merchants are still doing business with difficulty, owing to their inability to obtain material, and the unwillingness of consumers to pay such prices that will attract quantities into the market. Sales are usually small.

LARGE TONNAGES

Of Southern Iron Taken by Cast Iron Pipe Company.

New York, Sept. 17. (By wire.)—The heavy selling of southern irons has continued during the past week. The United States Cast Iron Pipe & Foundry Co. has bought a heavy additional tonnage from the south for eastern, western and southern plants. It is estimated 50,000 tons at least were ordered. One maker booked about 30,000 tons of this business.

The southern situation shows increasing strength. Stocks in August declined 8,000 tons and further decline is expected this month. The Tennessee company is practically sold up for this year. All leading southern makers are now asking $11.50 for this year. A sale of 6,000 tons for first quarter of 1914 to a consumer in the Birmingham district was at $11.75.

BOPE STRICKEN

And Operated Upon in New York—Serious Results Not Feared.

New York, Sept. 17. (By wire.)—Col. H. P. Bope, vice president and manager of sales of the Carnegie Steel Co., was suddenly stricken in this city with appendicitis and operated on at one city hospital last night. He came to New York yesterday to attend the monthly meeting of Corporation sales executives. At last reports, his condition was favorable and no serious results are expected.

WAR MATERIAL

Including That for Aeroplanes in Demand in England.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Sept. 6.

Pig Iron.—In all districts this week the tone of the iron market is reported to be more hopeful. The holiday lull has been longer than usual and activity has been resumed somewhat slowly. Forecasts of a good autumn trade, however, are discounted to a certain extent by business correspondence from Cuba, the West Indies and Central America, which suggests that on account of bad seasons in respect of various crops, these regions will not be such good customers to the British iron and steel trade as in average years. Brazil, too, has been hard hit in coffee and rubber and indents for that country appear likely to be less favorable than usual. On the European continent, too, things are upon the whole dull, though from the northern markets it is reported that continental buying of pig iron is increasing. The home trade is better only in parts, the Sheffield district being by far the best off for work at present. Shipments from Middlesborough have increased during the week in spite of the stiffening of freights, due largely to coal difficulties. Home buying of pig iron in the north has become much steadier, but here, as everywhere else, small lots continue to be the rule. Makers and sellers, however, think the outlook to be quite good. Consumption and production are now pretty evenly balanced and the unfortunate effects of the long speculative struggle are now being left behind. Stocks in merchants' hands are decreasing and no longer exceed the exigencies of demand. The stocks in pig iron in public stores show almost a daily reduction. The total yesterday was 183,183 tons, a decrease of 4,130 tons on the week. The week-end saw business a little quieter. The closing schedules for No. 3 Cleveland was a little lower than during the week, being 56s. No. 4 foundry was 55s 6d. In hematite iron but a small business is being done, consumers being of opinion that the price is too high. East coast hematite is quoted at 68s 6d ($16.60) per ton.

Finished Iron and Steel.—The steel trade is generally weak. The reductions in prices of finished material have scarcely, if at all, stimulated buying. Buyers are still looking for further reductions, but producers whilst making concessions here and there where advantageous contracts are to be placed, are disinclined to commit themselves forward on the basis of present prices. The next week or two will probably determine whether firmness on the present price basis can be maintained. There is a comparative dearth of constitutional enterprise. The home railway companies are buying as little as possible, whether of track or of vehicle material. Foreign business, especially for India and the British Colonies, is increasing, but Canada as a customer has not come forward this autumn so well as was expected. Tools and agricultural implements are in very good demand. In high-speed steel business is increasing. Large tonnages have been ordered during the week for Rio de Janeiro, Valparaiso, and South Africa. A contract has been divided between two Sheffield firms for 12,000 tons of iron pipes for South America. Sheffield is laying itself out largely for the manufacture of steel for aeroplane construction and the British admiralty is among the inquirers for this class of material. Both Britain and foreign powers are placing large contracts for heavy forgings and castings, turbine drums and fittings, and armor plating. In fact, the trade in war material has almost reached a boom.

Nelson's New Company

C. J. Nelson has disposed of his interest in the Nelson Foundry Co., North Milwaukee, Wis., to the other stockholders and has organized the Nelson Co., which is now engaged in the construction of a foundry and machine shop at Menomonee Falls, Wis. The Nelson foundry at North Milwaukee was destroyed by fire last winter. Mr. Nelson's new company takes over the entire transmission line business of the Nelson Foundry Co., and will devote the new Menomonee Falls works to the production of shafting hangers and boxes. The old company will concentrate its attention to the gray iron foundry business, specializing in light floor work. The casting shop is equipped to do work up to 3,000 pounds.

METAL MARKETS

New York

Sept. 15.

Copper.—As a result of the heavy liquidation of standard copper last week, the outside market here developed a slight weakness and during the latter part of last week electrolytic was quoted at 16.50c cash, New York. This quotation was largely nominal. Today, with the receipt of cables showing advances in London, the market again became very firm and producers and leading selling agencies now quote electrolytic at 16.75c. Lake is held at 17c to 17.25c and casting at 16.62½c to 16.75c. Although the demand for the latter metal is not heavy, casting is very scarce and hard to obtain. The demand for electrolytic and lake is quiet but steady.

Today's London close was strong at £74 15s for spot and £74 7s 6d for three months, compared with £73 5s for both positions a week ago. In New York, there were no bid prices, but 17c was asked for spot standard. Exports so far this month amount to 13,052 tons.

Tin.—Demand from consumers of this metal is keeping up satisfactorily, and there is a fair volume of business in 5 and 10-ton lots for delivery during the next three months. On the metal exchange, a weakness in tone developed during the latter part of last week. Today, however, there was a resumption of activity and prices for spot were 42.75c bid and 43c asked, the close being firm. There were sold today on the exchange for delivery this week, 15 tons at 42.87½c. Indications are that about 4,500 tons of the metal, including stocks in warehouses, will be available for delivery into domestic consumption this month. So far, arrivals amount to 1,163 tons and tin afloat to 3,595. Today's close on the London exchange was £192 5s for spot and £192 for three months, compared with £194 for spot and £192 15s for three months a week ago. This is a decline of £2 15s during the past two weeks for spot.

Lead.—The lead market continues steady, although demand is rather quiet. The outside price for 50-ton lots, New York delivery, continues to be 4.75c, with some sellers asking 4.80c.

Spelter.—This market continues uneventful, the demand being quiet. The price generally asked is 5.95c, New York, for carload lots, but some business is being done at 5.85c and 5.90c. A premium is being asked upon small spot lots.

Antimony.—Demand is dull, but the price continues firm; Cookson's, 8.30c; Hallett's, 7.75c to 8.00c; other brands, 7.37½c to 7.62½c.

Chicago

Sept. 15.

New Metals.—The advance in spelter which has been continuous for a number of weeks seems to have finally been checked, much to the relief of prominent galvanized sheet makers in the west. Lead is also steady and copper is practically unchanged. There is a fairly liberal amount of buying most of which is for immediate consumption.

We quote dealers' selling prices f. o. b. Chicago as follows:

Lake copper, carload lots, 16½c, casting, 16⅜; smaller lots, ⅛c to ¼c higher. Spelter, car lots, 5.80c; lead, desilverized, 4.75c; sheet zinc, $8.00, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 43c; Cookson's antimony, 8½c; other grades, 7½c.

Old Metals. — Copper, brass and lead are somewhat firmer. The demand for old metal seems to be improving. One of the largest manufacturers in Chicago, controlling several foundries has been buying liberally recently for its brass melting departments.

We quote dealers' selling prices f. o. b. Chicago as follows:

Copper wire, crucible shapes, 13c; copper bottoms, 12¼c; heavy red brass, 12½c; heavy yellow brass, 8½c; No. 1 red brass borings, 11c; No. 1 yellow brass borings, 7¾c; brass clippings, 10c; lead pipe, 4½c; zinc scrap, 4½c; tea lead, 4c; No. 1 aluminum, 17c; No. 1 pewter, 28c; block tin pipe, 36½c; tin foil, 32c; linotype dross, 3¼c; electrotype dross, 3¼c; stereotype plates, 4½c; stereotype dross, 3¼c.

UNIQUE BUILDING

For Use of Army and Navy Inspectors at Bethlehem Works.

A structure of unique type in the layout of the ordinary steel works has been completed by the Bethlehem Steel Co., South Bethlehem, Pa., and has been dedicated to the use of the United States government army and navy officers and inspectors who are permanently stationed at this plant inspecting materials for the government under manufacture by the company. This building is in the form of an office and laboratory building of handsome and substantial design and fitted out so completely with the facilities for which it is intended as to make it one of the most modern structures of its type in the United States. A reception tendered on Thursday afternoon, Aug. 28, by the officers and superintendents of the Bethlehem Steel Co. to the resident officers and inspection forces marked the formal opening of the new building.

The United States government maintains a permanent force of approximately 30 men at the Bethlehem works, who are engaged in the detail inspection of armor plate, guns, projectiles, field carriages and other munitions of war, as well as heavy battleship shafting and miscellaneous forgings. At the present time the company is manufacturing armor plate for the battleships Nevada, Oklahoma and Pennsylvania. It also has in process of manufacture forgings for guns of various caliber, ranging from one-pounder to 14-inch. Similarly, in the projectile department of the company, large orders for all sizes of armor piercing and target projectiles are being executed, as well as shrapnel. These projectiles also range in size from one-pounder to 14-inch. In the general machine shops there are in course of manufacture, at all times, forgings for battleships, torpedo boats, submarines and other government vessels.

The interior is divided in the most convenient manner possible, with a separate suite of offices for each department. The army department is located on one side and the navy department on the opposite side of a large hallway running the entire length of the building.

At the far end of the building is located a modern chemical laboratory, containing the most approved sanitary equipment and furnishings.

One of the features of the building is the attractive entrance, which has been set back about 25 feet from the line of the avenue. Cement walks, drives and curbing will be provided, and all the adjoining grounds will be tastefully laid out in grass and shrubs, following the general system adopted by the Bethlehem Steel Co. in regard to parking and beautifying the surroundings of its various buildings, departments, etc.

John A. Topping, chairman of the board of directors, C. T. Johnston, general manager of sales, and W. B. Topping, sales manager in the Philadelphia district, all of the Republic Iron & Steel Co., are on a hunting trip on private preserves in the province of Quebec. They will return about Oct. 1.

Iron on the Coast

The accompanying table gives a comparison of analyses of various kinds of pig iron recently imported on the Pacific coast.

COMPARISON OF ANALYSES.

	Cleveland No. 3.	Redcar No. 3.	Hanyang No. 3.	Tata No. 3.	Bengal B. quality.
Graphitic carbon	3.01	3.73	3.20	3.400	2.98
Combined carbon	0.27	3.73	3.20	0.805	0.32
Silicon	2.80	2.70	2.10	1.751	2.26
Phosphorus	1.50	1.67	0.14	0.306	1.21
Manganese	0.58	0.65	0.73	0.864	1.13
Sulphur	0.04	0.07	0.04	0.030	0.03

Smoke Preventers Meet

Pittsburgh, Sept. 16. — Joseph M. Searle, chief inspector of the Bureau of Smoke Abatement, Pittsburgh, and vice president of the International Association for the Prevention of Smoke, was elected president for the year 1913-14 at the final session of the eighth annual convention of the association, held in this city last week. Lewis C. Towner, Detroit, was elected vice president, and John Krause, Cleveland, was re-elected secretary and treasurer. The convention next year will be held at Grand Rapids, Mich.

J. G. Walker, Chicago, of the Roney Stoker Department, Westinghouse Machine Co., presented a paper on the "Standardization of the Installation of Boilers and Stokers", at the closing session, which was followed by an interesting discussion. E. P. Roberts, Cleveland, gave his experience in obtaining data regarding combinations of stoker and boiler installations in the Ohio metropolis, and S. H. Vail, Chicago, described a number of installations in his city which had been improved at slight expense.

BAR IRON WAGE

Fixed at $7 For Two Months—Republic Will Close Mahoning Plant.

Sales of bar iron from selected mills in July and August averaged slightly above 1.50c, it was disclosed Sept. 12, at the bi-monthly meeting of representatives of the Amalgamated Association of Iron, Steel and Tin Workers and the Republic Iron & Steel Co. and the Western Bar Iron Association, entitling puddlers to a $7-a-ton rate for September and October. Actual sales of bar iron have registered only a fractional decline the last six months.

The Republic Iron & Steel Co. plans to shut down its Mahoning valley works, in which a battery of puddling furnaces and considerable rolling mill equipment are installed. After this mill is closed, the company will make bar iron only at its Chicago mills. Operations at Youngstown probably will be discontinued by October.

Labor trouble at the Pope plant of the Phillips Sheet & Tin Plate Co., at Steubenville, O., has not been settled, although managers have succeeded in operating the plant in full the last fortnight.

Leading mills employing puddlers identified with the United Sons of Vulcan have not yet signed the flat $7-a-ton scale, and puddling furnaces have been idle since July 1.

Bi-monthly settlements with the Amalgamated Association since January, 1912, and yearly averages since 1906, are as follows:

Bi-Monthly Settlements.

	1913.	1912.
Jan.-Feb.	1.4831c	1.187c
Mar.-Apr.	1.5434c	1.195c
May-June	1.5272c	1.2183c
July-Aug.	1.50c	1.2518c
Sept.-Oct.	.....	1.3351c
Nov.-Dec.	.....	1.40c
Year's ave.	.....	1.2645c

Annual Average of Settlement.

For year 1911	1.2598c
For year 1910	1.4423c
For year 1909	1.360c
For year 1908	1.386c
For year 1907	1.627c
For year 1906	1.587c

Stocks of Virginia Pig Iron

Total stocks of pig iron upon the banks of Virginia furnaces at the present time are reliably estimated at not over 70,000 tons. Of this quantity, about 55,000 tons is understood to be in the hands of the Virginia Iron, Coal & Coke Co. at its different plants, some of which is under sale.

This level of stocks represents a very favorable statistical position of the Virginia market. The Pulaski furnace has gone out and the Iron Gate furnace will shortly go in, leaving six furnaces in Virginia in blast.

FOREIGN FIRM

Awarded Contract by Navy Department—The New Policy.

Washington, Sept. 16.—Disregarding past precedents, the navy department has entered upon the policy of seeking bids for supplies from foreign countries and during the past week awarded a contract for rotary turbine drums for battleship No. 39 to Cammell, Laird & Co., Ltd., Sheffield, Eng., constituting the Cyclops Steel & Iron Works, for $57,436. The award was made through John Platt & Co., 97 Cedar street, New York City, agents for the English steelmakers.

Competing bids for this contract were submitted by the Bethlehem Steel Co., and the Midvale Steel Co., whose figures were $169,568 and $160,272, respectively.

Acting Secretary Roosevelt said the bids were awarded to the English concern upon the recommendation of the bureaus of steam engineering and supplies and accounts and declared that, in view of a saving of $102,000 on this single contract, the foreign bid could not be ignored, even though it was the policy of the department to place all possible contracts in the United States. It was made known at the same time that foreign makers will henceforth be invited to offer bids for navy contracts.

Secretary Daniels would pass only a few remarks on the action of the department, and they were prompted by an impassioned speech against American steelmakers which Representative Cullop, Democrat, of Indiana, asked to have inserted in the *Congressional Record*.

"Whenever American manufacturers make the right prices, they will get the contracts," said Secretary Daniels.

The English makers' bids provide for payment by them of the duty on the turbine drums, which will approximate $7,000 under the rates of the pending tariff bill and they will not be delivered till that measure becomes a law.

Will Sell Business.—The business, property and good will of the I. & E. Greenwald Co., Eggleston avenue and Pearl street, Cincinnati, will be sold at receiver's sale, beginning on Oct. 15. The affairs of the company, which was established in 1847, were recently placed in the hands of a receiver on a petition filed by William E. Greenwald, an official of the company. The Court of Insolvency, Hamilton county, Ohio, has ordered the receiver to conduct the above sale. The company manufactures steam engines, mill work and gearing and is still operating the plant under the direction of the receiver, John H. Gibson.

ENGLISH WARRANTS

Purchased, Possibly for Consumers in the United States.

New York, Sept. 16.—A purchase of 50,000 tons of Middlesbrough warrants by a large middleman, has attracted more attention to the English iron market. As the purchaser in the past has acted in behalf of eastern Pennsylvania cast iron pipe interests, when the latter were importing English iron, a report has originated that this metal might be intended for delivery in the United States. Furthermore, it has been known that one large Delaware river pipe maker recently has been sounding out the situation on ocean freights from the Cleveland district to Philadelphia. There is no confirmation, however, that this iron is for the direct account of American purchases and the fact that the free listing of pig iron is not yet an established fact in the new tariff makes it uncertain that this has actually happened. At the same time a purchase of warrants would be a natural procedure under present conditions. As pointed out, Middlesbrough No. 3 at present prices, delivered along the Delaware river without duty, is about on a parity with northern No. 2X and higher than southern No. 2.

Stocks of iron in the Cleveland district, Sept. 4, were 183,140 tons, a decrease in the week of 4,129 tons and in the year to date of 58,483 tons. In the Cumberland district, the stocks on the same date were 19,601, a decrease of 160 tons in the week and 16,822 tons this year.

A buyer at Genoa, Italy, who has been negotiating with makers in this country for Alabama iron, has closed with a southern producer for 1,500 to 2,000 tons of No. 2 for shipment through November. The price is reported to have been about $15.00, delivered, Genoa, which would be equivalent to close to $11.00, Birmingham.

The York Bridge Co., York, Pa., has passed into the hands of receivers appointed by Judge Wagner Sept. 12. The action was taken on a bill of equity filed by Oscar Thompson, of Phoenixville, and John W. Steacy, of York, stockholders, and Elmer E. Brunner, a creditor. The company has a plant in Spring Garden township, and has assets of about $500,000, but it has been unable to purchase material for unfilled orders amounting to $160,000.

STEEL VESSELS

Will be Built by Coast and Lake Shipyards.

No less than 10 or 12 steel vessels of large size will be placed with coast and lake shipbuilders during the next few months, according to opinions expressed in high circles in the steel trade.

A survey of the situation shows a large number of vessels in the preparatory stage of plans issued or prices being taken now before the shipyards along the Atlantic coast. A project by the Florida & East Coast railway provides for the establishment of an open-sea ferry from Key West to Havana, and contracts for two unusually large ferry boats for this line are about to be placed. These boats will be 411 feet long, 58 feet beam and 24-inch depth of hold, and each will have a capacity of carrying 36 of the largest passenger cars. The Atlantic Coast Line, as previously reported, is figuring on a car ferry of unusual size. The Hamburg-American Steamship Co. is again reviving its plans for the building of three large freight and passenger steamships for coastwise traffic through the Panama canal. These boats will be 500 feet long, and will have a speed of not less than 18 knots per hour. The United Fruit Co. is also figuring on a fleet of vessels to run through the Panama canal. The boats of this company have usually been built by Workman & Clark, of Belfast, Ireland, but it is expected that by reason of the toll exemption for American built vessels, several of these steamships will be built in this country.

The New York Shipbuilding Co. will build a steel hydraulic dredge for the government for use on the deep inland waterways between Norfolk and Beaufort, N. C. About 500 tons of steel will be required. The Isthmian Canal Commission will soon take bids on three sea-going tugs, 135 feet long, 30 feet beam and 17 feet depth of hold for use on the Panama canal. These will have 1,200 horsepower, and engines will be adapted to use either coal or fuel oil.

The Siebers & Raisch Pattern Wks., 686-690 National avenue, Milwaukee, has established a branch in Waukesha, locating in the Bullard shop buildings at 517 Main street. Mr. Raisch has taken personal charge of the branch, which will specialize in job work for the numerous brass, iron and aluminum foundries and other industries in Waukesha.

MODERATE LETTINGS

Of Structural Material, But Many Projects Pending.

Only moderate lettings of building steel continue to be made in eastern districts. Leading fabricators do not expect much change in the situation before November,. when preparation for spring work is expected to assert itself. Financial conditions are still unfavorable for active building work. The Ford Automobile Building Co. building, Philadelphia, 4,000 tons, now closed, is the largest active project in the east. Attention is directed to the appointment of a receiver for another eastern bridge shop, as evidence of the narrow margin of profits at which much work has been taken in recent months.

Pittsburgh fabricators have experienced a quiet week and there is no indication of immediate improvements, as no important undertakings are being considered in this territory. Some of the smaller shops are in a position to offer rather quick deliveries and appear anxious to take additional work at this time.

The tonnage covered by fabricating contracts reported in the west amounts to 5,400 tons. This indicates a rather encouraging increase in business, and it is evident that the fabricating shops will not be short of work for some time to come. Fabricators are maintaining their prices very well, although there is some tendency to shade quotations when larger orders are in prospect.

STRUCTURAL AWARDS.

Kansas City Terminal Ry. Co., power house, Kansas City, Mo., 672 tons to the Kansas City Structural Co.

Allis-Chalmers Mfg. Co., shop building, Milwaukee, 618 tons, to American Bridge Co.

J. R. Watkins Medical Co., columns and cast bases, Winona, Minn., 465 tons, to the Kenwood Bridge Co.

Panama-Pacific Exposition, fine arts building, San Francisco, 1,485 tons to American Bridge Co.

Royal Hippodrome, Chicago, 447 tons let to the Chicago Steel Products Co.

Approaches to Commonwealth Pier, Boston, 2,000 tons. Award to Boston Bridge Works.

Ford Automobile Co. service building, Philadelphia, about 4,000 tons. General contract placed with Irwin & Leighton. Award of steel not yet made.

Steel stack, 150 feet high, 7 feet in diameter, for Pennsylvania Co., Pittsburgh, the Riter-Conley Mfg. Co.

CONTRACTS PENDING.

New shops, Crane Co., Chicago. About 3,000 tons will be involved.

Lincoln Memorial, Washington, 3,000 tons of sheet piling and small tonnage structural shapes. Bids received, but final action not yet taken. Different alternatives have been submitted and not yet assured sheet steel piling will be used.

St. Ignatius Loyola High School, Madison avenue, New York City, originally figured to require 1,400 tons. Revised plans being figured.

Astor loft building, Fifth avenue, New York City, 1,500 to 2,000 tons. Award about to be made.

High School, Springfield, Mass., 1,200 tons. Bids entered.

Apartment building for Almore Realty Co., Eighty-sixth street, New York City, 600 to 800 tons. Steel about to be placed.

On the Holyoke Hotel Co.'s new hotel, Holyoke, Mass., Esenwein & Johnson, Buffalo, and George P. Alderman, Holyoke, associate architects, will open bids this month, requiring between 600 and 700 tons.

RAILROAD BUYING

Is Not Active—New York Central Distributes 2,000 Tons of Steel.

There continues little snap in railroad buying of iron and steel products. Rail orders remain of miscellaneous character. Car inquiries and purchases are few and bridge and structural work is only moderate. The outlook, however, suggests some improvement before many weeks. October, it is expected, will show a more decisive movement in the buying of the railroads. The New York Central lines have distributed 2,000 tons of structural work, the Lehigh Valley is taking bids on 1,200 to 1,500 tons, the Boston & Albany wants 1,000 tons and there are other scattered tonnages being offered. Another section of the New York subway to require 6,000 to 7,000 tons, is up for bids.

The New York Central railroad has just put out inquiries for a number of machine tools for installation in its various shops. Included are five or six punches for the car shops at West Albany and East Buffalo, N. Y. It is expected that the Boston & Maine railroad will close some time this week on the list of machine tool specifications which it recently issued.

CAR AND LOCOMOTIVE ORDERS.

The Mond Nickel Co., Ltd., has placed one Mogul switching locomotive, with the American Locomotive Co.

The Corbin Coal & Coke Co. has ordered one rotary snow plow from the American Locomotive Co.

The Pullman company has divided an order for 300 passenger cars for the New York Central lines with several car builders. The Northern Pacific is inquiring for 45 refrigerator cars and 12 baggage cars.

BRIDGE AWARDS AND INQUIRIES.

Three span highway bridge for city of Baltimore, 1,000 tons. McClintic - Marshall low bidder.

Philadelphia & Reading railway viaduct at Olney, Pa., 800 tons. Bids entered this week.

City of Philadelphia, various small bridges, 500 to 600 tons. Bids received Sept. 21.

McClintic Marshall Construction Co. recently awarded 250 tons and Keystone Structural Co. smaller tonnage of similar work.

The Lehigh Valley Railway Co., New York office, is taking bids this week on about 1,500 tons of structural to be used in extending the street viaducts over the Hamburg canal strip, in Buffalo, purchased from the city as an approach to its proposed new passenger station.

Highway bascule bridge, Wilmington, Del., 700 tons. Strauss Bascule Bridge Co., Chicago, low bidder.

New York Central railroad, 1,700 tons for terminal area work and 260 tons for a highway bridge in New York City, placed with independent shops.

Lehigh Valley railroad, 1,200 to 1,500 tons of bridge work at Buffalo. Inquiry issued.

Boston & Albany railroad, 1,000 tons of bridge work. Bids go in this week.

Section No. 2 of the Seventh avenue subway line, New York City, estimated to require 6,000 to 7,000 tons. Bids will be received Oct. 1.

Chicago & Eastern Illinois R. R. Co. bridge over Wabash river, Clinton, Ind., 384 tons to Lackawanna Bridge Co.

Lafayette Engineering Co., Main street bridge, Lafayette, Ind., 1,604 tons to the American Bridge Co.

The Trade of Canada

The total foreign trade of Canada during the calendar year 1912, exclusive of movements of treasure, according to United States Consul-General Foster, of Ottawa, amounted in value to $997,555,201, an increase of $198,306,058 over 1911. Of this total, $547,358,264 represented trade with the United States, which increased by $120,191,578 over 1911. The United States supplied nearly two-thirds of Canada's imports, and took more than one-third of its exports. Great Britain was Canada's largest customer, purchasing nearly half of the total exports.

Canada's imports of automobiles in 1912 amounted to $9,391,824, an increase of $3,548,246 over 1911, of which the United States supplied $8,748,576, Great Britain $566,381, and other countries $76,867. Canadian-made automobiles to the value of more than $2,000,000 were exported, chiefly to Australia, New Zealand, and South Africa.

Wisconsin Firm Bankrupt

A voluntary petition in bankruptcy was filed by the Beaver Dam, Wis., Malleable Iron Co., Sept. 16. Assets on June 1 were $640,000 and liabilities Sept. 1, $500,000. Ernest E. Smythe, Milwaukee, was appointed receiver, and will operate the plant as a going concern. The Thomas Furnace Co., Milwaukee, is creditor for $25,000. Lawrence Fitch, Milwaukee, son-in-law of the president of the Chicago, Milwaukee & St. Paul railroad, is heaviest creditor, with $150,000.

Daniel Thompson Larkin, head of the Larkin Steel Reed Co., of Danielson, Conn., and Providence, R. I., died at South Killingly, Conn., Sept. 14. He was 60 years of age.

ORE STOCK PILES

None Drawn Upon Last Year—Production of the Country.

An advance chapter from the mineral resources of the United States for the calendar year 1912 shows that the quantity of iron ore mined in the United States in 1912 amounted to 55,150,147 long tons, as compared with 43,876,552 long tons mined in 1911, an increase of 11,273,595 long tons, or 25.69 per cent. The quantity of iron ore marketed in the United States in 1912 amounted 57,017,614 long tons, valued at $107,050,153, as compared with 41,092,447 long tons, valued at $86,716,575, marketed in 1911. This represents an increase in quantity of 15,925,167 long tons, or 38.75 per cent, and in value of $20,333,578, or 23.45 per cent. The average price of ore per ton for the whole country in 1912 was $1.88, as compared with $2.11 in 1911.

The accompanying table shows the ore mined in the United States by geographical districts for 1911 and 1912. Comparing the iron ore production with the iron ore shipments from the Lake Superior region, it will be noted that in 1912 the iron ore mined was 46,483,798 tons, while THE IRON TRADE REVIEW'S annual compilation shows that in 1912 the iron ore shipments from the Lake Superior region were 48,221,,546, or 1,737,748 tons more than the amount mined. This shows the total taken from the stock piles. On the other hand, in 1911 the tonnage mined was 35,672,804 and the total shipments were 32,793,130, showing that 2,879,674 tons were added to the stock piles in that year. The Minnesota iron mines in 1912 furnished nearly 62.5 per cent of the total for the United States. Iron ore was mined in 27 states in 1912, as well as in 1911. Four states, Idaho, Montana, Nevada and Utah, produced ores for fluxing only.

IRON ORE MINED IN THE UNITED STATES, BY GEOGRAPHIC DISTRICTS, IN 1911 AND 1912, IN LONG TONS

	1911		1912	
District.	Quantity.	Percentage of total.	Quantity.	Percentage of total.
Northeastern	2,008,923	4.79	2,139,058	3.88
Southeastern	5,291,879	12.06	5,665,386	10.27
Lake Superior (a)	35,672,804	81.30	46,483,798	84.29
Mississippi Valley	65,975	.15	46,480	.08
Rocky Mountain	746 971	1.70	812,917	1.48
Pacific slope	(b)	.....	2,508	.....
Total	43,876,552	100.00	55,150,147	100.00

(a)—Includes all Wisconsin mines.
(b)—Pacific slope included in Rocky Mountain district.

The first meeting of the creditors of the Goeller Iron Works, Newark, N. J., will be held at the bankruptcy court room, Essex building, Clinton and Beaver streets, in that city, on Sept. 18. At this time, the creditors will prove their claims, appoint a trustee, examine the bankrupt and transact such other business as may come before the meeting.

INTERESTING RESULTS

Obtained From Investigation of Titaniferous Iron Ores.

Bulletin 64, "The Titaniferous Iron Ores in the United States, Their Composition and Economic Value," by Joseph T. Singewald Jr., has just been published by the bureau of mines.

Dr. Joseph A. Holmes, director of the bureau, in the preface to the publication says:

"It is to be regretted that the results of Mr. Singewald's careful study of the ores are chiefly negative. Some deposits of titaniferous iron ore are clearly not as extensive nor as high in iron as they were reported to be. Moreover, examination of many samples by metallographic methods has demonstrated that although a large part of the titanium in these ores is in the form of ilmenite, much of this ilmenite is far more intimately associated with the magnetite than has generally been supposed. Part of the magnetite and ilmenite occurs in such large and distinct aggregates that their separation by a magnetic concentration after fine crushing is practicable, but in by far the larger number of samples examined and in practically all the ore bodies that are known to be large enough, and rich enough in iron to be of much importance, most of the ilmenite occurs as such fine intergrowths in the mass of magnetite that a complete separation of the two minerals by any process based on difference of physical properties still seems impractical. Crushing even to 200 mesh would not insure a clean separation of the two minerals. Consequently the problem of utilizing titaniferous magnetites involves the application of chemical rather than physical methods. In short, the problem is not one of eliminating the titanium by milling but of reducing the ores directly by some smelting process.

"Iron ores containing over 1 per cent of titanium are troublesome to smelt in the blast furnace. Though Rossi and other investigators have demonstrated the possibility of eliminating titanium through the formation of relatively fluid slags consisting of complex titanosilicates, there seems to be no inclination on the part of ironmasters to adopt furnace practice to these conditions. However, as Mr. Singewald points out, it is practicable to use in blast-furnace mixtures small proportions of the concentrates from a magnetic separation of the titaniferous ores with little change in present methods and without danger of choking a furnace. The use of electricity in smelting offers other possibilities. The reduction of titaniferous ores in electrically heated furnaces and the production of iron-titanium alloys by a direct process are problems of such importance that the bureau of mines, in connection with its investigations of the treatment of ores and of more efficient methods of smelting, is undertaking experiments with these ores. The results of these experiments will be published in future reports of the bureau."

Copies of this bulletin may be obtained by addressing the director, bureau of mines, Washington, D. C.

Makes Annual Report

The Pittsburgh Steel Co. has issued its earnings statement for the fiscal year ending June 30, 1913. The statement and comparisons follow:

	1913.	Increase.
Sales	$11,654,888.02	$237,018.50
Inv., end of year..	1,143,931.72	134,046.03*
	$12,798,819.74	102,972.47
Inv. begin. year...	1 277,977.75	231,279.69
	$11,520,841.99	128,307.22*
Mater. and op. cost	9,193,759.87	225,890.00
	$2,327,082.12	354,197.22*
Deduc. sell. exp...	1,186,339.12	183,386.65*
	$1,140,743.00	170 810.57*
Add. misc. income.	84,921.61	74,902.61
	$1,225,664.61	95,907.96*
Int. charges	31,995.12	10,810.70
Net earnings.....	$1,193,669.49	$106,718.66*

*Decrease.

J. S. Cox, general manager of the Spanish-American Iron Co., and other mining properties of the Pennsylvania Steel Co., died at his home in New York City recently, aged 46. Mr. Cox graduated from the school of mines, Columbia University, in 1887, immediately after which he became identified with the Carnegie Steel Co., at Homestead, Pa., later becoming manager of the Monte Cristo mines in the state of Washington.

IRON AND STEEL PRICES

Pig Iron

PITTSBURGH

(Through This Year.)

Bessemer	$16.60
Basic	15.15
No. 2 foundry	14.90
Malleable	14.90
Gray forge	14.40

(The freight from valley points is 90c.)

CLEVELAND

(Through this Year Delivered in City.)

No. 1 foundry	$15.00 to 15.50
No. 2 foundry	14.75 to 15.00
No. 2 southern	15.10 to 15.35
Bessemer	16.65
Silveries 8 per cent silicon	20.05

CINCINNATI

(Third and Fourth Quarters.)

Southern foundry No. 1	$14.75 to 15.25
Southern foundry No. 2	14.25 to 14.75
Southern foundry No. 3	13.75 to 14.25
Southern foundry No. 4	13.50 to 14.00
Southern gray forge	13.25 to 13.75
Mottled	13.25 to 13.50
Southern No. 1 soft	14.75 to 15.25
Southern No. 2 soft	14.25 to 14.75
Standard southern car wheels	27.25 to 27.75
Southern Ohio No. 2	15.20
Southern Ohio No. 3	14.70
Southern Ohio No. 4	14.45
Silveries 8 per cent silicon	18.20 to 18.70

(Freight from Ironton, $1.20; from Birmingham, $3.25.)

CHICAGO

(Delivered Chicago, this year, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnace.)

Lake Superior char., No. 1 to 4	$15.00
Northern foundry No. 2	15.00
Southern foundry No. 2	15.35
Jackson co. silveries, 8 per cent	19.40
South'n silveries, 5 per cent sil.	17.35
Alabama basic	15.35
Malleable	15.00

PHILADELPHIA

(Prompt and third quarter shipment delivered to consumer's plants, in Philadelphia and vicinity, unless otherwise specified.)

Northern No. 1X foundry	$16.25 to 16.50
Northern No. 2X foundry	15.75 to 16.25
Northern No. 2 plain	15.50 to 15.75
Standard forge (Eastern Pa.)	15.00 to 15.25
Virginia No. 2X	15.80 to 16.05
Southern No. 2	15.00 to 15.50
Standard low phos., Phila.	23.00 to 23.50
Lebanon low phos., furnace	17.50 to 18.00
Malleable	16.25 to 16.50
Basic (Eastern and Central Pa.)	15.00 to 15.40

NEW YORK

(Prompt and third quarter delivery, prices based at Jersey City and tidewater.)

Northern No. 1X foundry	$16.50 to 16.75
Northern No. 2X foundry	16.00 to 16.50
Northern No. 2 plain	15.50 to 16.00
Virginia No. 2X	16.10 to 16.35
Southern No. 2	15.25 to 15.75
Malleable	15.75 to 16.00
Gray forge	14.75 to 15.00

ST. LOUIS

(Throughout This Year.)

Southern No. 1	$15.25
Southern No. 2	14.75
Southern No. 3	14.25
Southern No. 4	13.75

(Freight, Birmingham to St. Louis, $3.75.)

BIRMINGHAM

(For southern delivery.)

No. 1 foundry	$12.00 to 12.50
No. 2 foundry	11.50 to 12.00
No. 3 foundry	11.25 to 11.75
No. 4 foundry	11.00 to 11.50
Gray forge	11.00 to 11.50
Mottled	10.25
Standard basic	11.50
Off basic	11.00
Charcoal	25.00

BUFFALO

(Through this year, delivered in city).

No. 1 foundry	$14.75 to 15.00
No. 2X foundry	14.25 to 14.75
No. 2 plain	14.00 to 14.25
No. 3 foundry	14.00
Gray forge	13.75 to 14.00
Malleable	14.50 to 14.75
Basic	14.50 to 14.75
Charcoal	15.75 to 16.75
Charcoal (special brands)	17.00 to 20.00

Ferro Alloys

English and German 80 per cent ferro-manganese, prompt and forward delivery, $54 to $56 seaboard.

Fifty per cent ferro-silicon on contracts, $75, Pittsburgh, or Philadelphia, for carloads; $74 for larger lots and $73 for 600 tons or more. Twelve to 13 per cent, $24. Eleven to 12 per cent, $23. Ten to 11 per cent, $22. Nine to 10 per cent, $22 f. o. b. Globe, Jisco and Ashland furnace. Freight to Pittsburgh, $1.90.

Ferro-carbon titanium 8 cents per pound for carload lots; 10 cents per pound for 2,000-pound lots and over; 12½ cents per pound in lots up to 2,000 pounds.

Freight rates on ferro-manganese, foreign spiegeleisen and electrolytic ferro-silicon from Baltimore to Pittsburgh, $2.16; to Youngstown, $2.48; to Cleveland, $2.57; to Detroit and Columbus, $2.99; to Cincinnati, $3.40; to Chicago and Milwaukee, $4.00. Freights from Philadelphia and New York, 10 to 30 cents higher, respectively.

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Denver	84½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, shapes and plates	80 cents

Coke

AT HE OVENS.

	Prompt shipment.	Contract.
Connellsville district:		
Foundry coke	$2.85 to 3.10	$3.00 to 3.25
Furnace coke	2.25 to 2.50	2.50
Wise county district:—		
Foundry coke	$2.75 to 3.50	$2.75 to 3.50
Furnace coke	2.25 to 3.25	2.35 to 3.25
Pocahontas district:—		
Foundry coke	$3.00	$3.00
Furnace coke	2.35 to 2.50	2.60 to 2.75
New River district:—		
Foundry coke	$3.25 to 3.50	$3.25 to 3.50
Furnace coke	2.60 to 2.75	2.60 to 2.90

Iron Ore

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, prices are: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40; all at lower lake ports.

Foreign iron ores, 7½ to 8 cents per unit, f. o. b. cars eastern seaboard. Freight rates from Philadelphia to eastern Pennsylvania furnace points range from 35 to 75 cents per ton.

Semi-Finished Material

PITTSBURGH

Bessemer 4 x 4 billets with 0.25 carbon and less, $25.00; open-hearth rolling billets, $25.00; Bessemer sheet bars, $25.50 to $26.00; open-hearth sheet bars, $25.50 to $26.00 f. o. b. Pittsburgh and Youngstown. Forging billets, $30, Pittsburgh. Wire rods, $27.50 to $28.00; muck bar, $31, Pittsburgh.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity; 4 x 4-inch open-hearth and Bessemer rolling billets at $25.50 to $26.50, and forging billets at from $31 to $32; muck bar, $28 to $30.

Standard Shapes

PITTSBURGH

Standard structural shapes, 1.40c to 1.45c. For extras see card of Sept. 1, 1909.

CHICAGO

Standard structural shapes, 15 inch and under, 1.63c.

PHILADELPHIA

Delivered to consumers in Pittsburgh and vicinity. Standard structural shapes from eastern Pennsylvania mills, 1.55c to 1.60c. From Pittsburgh mills, 1.60c.

NEW YORK

Standard structural shapes delivered at New York by eastern Pennsylvania makers 1.56c to 1.61c. On forward delivery, Pittsburgh district makers are quoting 1.61c, New York.

Plates

PITTSBURGH

Standard steel plates ¼ inch thick, 6¾ to 100 inches, 1.40c to 1.45c. For extras, see card of Sept. 1, 1909.

CHICAGO

Tank plates, 1¼ inches thick, 6⅝ to 100 inches wide, 1.58c to 1.63c.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: Tank plates from eastern Pennsylvania mills for prompt or forward delivery 1.55c to 1.60c. The larger Pittsburgh makers quote 1.60c, but smaller mills in that district are doing 1.55c.

NEW YORK

Steel plates, tank quality, for prompt and forward delivery at New York by eastern Pennsylvania makers, 1.56c to 1.61c. Pitts-

burgh makers are quoting 1.56c to 1.61c, New York.

Sheets and Tin Plate

PITTSBURGH

No. 28 black	2.10c to 2.25c
No. 30 tin mill black	2.10c to 2.25c
No. 28 galvanized	3.15c to 3.30c
No. 10 blue annealed	1.60c to 1.65c
No. 28 painted, corrugated	2.30c to 2.40c
No. 28 galvanized, corrugated	3.25c to 3.30c
Tin plate, 100-pound cokes	3.50c to 3.60c

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at 1.80c.

Pipe and Boiler Tubes

PITTSBURGH

	Black Butt.	Galv. Weld.
Steel, ¾ to 3 inches	80	71½
Iron, ¾ to 2½ inches	72	61
BOILER TUBES		
Steel, 3½ to 4½ inches	69	..
Iron, 3½ to 4½ inches	58	..

Other sizes of pipe and tubes take the usual advances as per official cards.

Rails and Track Material

PITTSBURGH

Steel rails, 50-pound and heavier, 1.25c per pound for Bessemer and 1.35c for open-hearth, carload olts; less than 500 tons 1.35c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, base, Pittsburgh; track bolts, 2.40c base, Pittsburgh.

Railroad spikes, 4½, 5 and 5½ and 9-16 inch, 1.65c.

CHICAGO

Light rails, carloads, 25 to 45-pound, 1.25c, base; 16 to 20-pound, 1.30c; 12-pound, 1.35c; 8-pound, 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $22 and $23; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings, f. o. b. Joliet:

Angle bars, 1.50c; railroad spikes, 1.70c; smaller size spikes, 1.85c base; track bolts with square nuts, 2.20c to 2.25c.

Bars, Hoops and Bands

PITTSBURGH

Common iron bars, 1.55c to 1.60c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. mill.

Hoops in carload lots, 1.60c, Pittsburgh; in less than carload lots, 1.65c; bands 1.40c, base, with net extras, as per standard steel.

Cold rolled and ground shafting, 60 to 62 per cent off in carloads and 55 to 57 per cent in less than carloads delivered in base territory.

CHICAGO

Bar iron, 1.35c to 1.40c, hard steel bars rerolled, 1.50c; soft steel bars, bands and small shapes, 1.58c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting, 58 per cent off list for carload lots, 53 per cent off for less than carloads.

PHILADELPHIA

Delivered in consumers' plants in Philadelphia and vicinity: Steel bars, 1.55c to 1.60c on contract and common bar iron, 1.32½c to 1.42½c. Cut nails 1.90c to 1.95c, Philadelphia. Shafting 62 and 60 off in carloads and 57 and 55 off in less than carloads in base territory.

NEW YORK

Delivered in New York steel bars on contract from 1.56c to 1.61c, and common iron bars, 1.33c to 1.45c.

Bolts, Nuts and Rivets

Rivets

Button head structural rivets, 2.00c, Pittsburgh, cone head boiler rivets, 2.10c. Small rivets, 75, 10 and 10 off.

Structural rivets, Chicago, 2.00c; boiler rivets, 0.10c extra.

Bolt and Nut Discounts

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, small and shorter, rolled threads, 75 and 10; cut threads, 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10 and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.70 off list; hot pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, $5.70 off; hexagon, blank or tapped, ⅜-inch and larger, $6.60 off; ¼-inch and smaller, $7.20 off.

Wire Products

PITTSBURGH

Wire nails, jobbers' carload lots, $1.65; retailers' carload lots, $1.70; cut nails (western makers), jobbers' lot, $1.65; painted barb wire, jobbers' carload lots, $1.65; retailers' carload lots, $1.70; plain wire to jobbers in carloads, $1.45; and to dealers in carloads, $1.50; polished staples, $1.65; galvanized staples, $2.05.

CHICAGO

Wire nails, jobbers' carload lots, $1.83; retailers' carload lots, $1.88; retailers' less than carload lots, $1.93; painted barb wire, jobbers' carload lots, $1.83; retailers' carload lots, $1.88; retailers' less than carload lots, $1.93; with 40c for galvanizing; plain wire, jobbers' carload lots, $1.63; retailers' carload lots, $1.68.

Cast Iron Pipe

CHICAGO

Four-inch water pipe, $27; ½ to 12 inches, $26; larger sizes, $24; gas pipe, $1 a ton higher.

NEW YORK

Six-inch pipe, 30 pounds to the foot, $23 to $25, f. o. b. New York, in carload lots.

BIRMINGHAM

Water mains: 4-inch, $22.00; 6 to 8-inch, $20.50; larger sizes, $20. Gas main: $1 per ton higher than water main. Special fittings, $47.50 to $52.50.

Old Material

PITTSBURGH

(Gross Tons Delivered.)

Heavy melting scrap	$12.50 to 12.75
Rerolling rails	14.00 to 14.50
Malleable	12.00 to 12.25
Bundled sheet scrap	8.00 to 8.25
Iron axles	23.00 to 23.50
Old iron rails	15.00 to 15.50
Stove plate	9.00 to 9.25
No. 1 wrought scrap	13.00 to 13.50
Old car wheels	12.50 to 13.00
Low phosphorus	15.00 to 15.50
Machine shop turnings	7.25 to 7.50
No. 1 busheling	11.00 to 11.50
Cast borings	8.25 to 8.50
No. 1 cast scrap	12.25 to 12.50

PHILADELPHIA

Gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey:

Old iron rails (nominal)	$17.00 to 17.50
Old steel rails (rerolling)	14.50 to 15.00
No. 1 heavy melting steel	11.50 to 12.00
Old car wheels	12.50 to 13.00
Old iron axles	25.00 to 26.00
Old steel axles	17.50 to 18.00
No. 1 railroad wrought	14.50 to 15.00
Wrought pipe	11.00 to 11.50
Cast borings	8.25 to 8.50
Machine shop turnings	8.00 to 8.50
Heavy cast (broken)	13.00 to 13.50
Malleable	11.50 to 12.00
Stove plate	9.50 to 10.00
No. 1 forge	10.00 to 10.50
Low phosphorus	15.00 to 15.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg, and Steelton, Pa.; $1.40 to Milton, Pa.

CLEVELAND

Gross Tons

Old iron rails	$15.00
Old steel rails (under 3 ft.)	13.00 to 13.50
Old steel rails (over 6 ft.)	13.50 to 14.00
Relaying rails	23.00 to 25.00
Old steel boiler plate	9.00 to 9.50
Malleable iron (railroad)	11.75 to 12.00
Axle turnings	7.50 to 8.00
Steel axles	18.00 to 19.00
Malleable iron (agricultural)	9.00 to 9.50
Heavy steel	10.75 to 11.25
Country mixed steel	9.00 to 9.50
Bundled sheet scrap	7.50 to 8.00

Net Tons

No. 1 R. R. wrought	$11.50 to 12.00
No. 1 busheling	9.50 to 10.00
No. 1 machine cast	11.50 to 12.00
No. 1 dealers' wrought	9.00 to 9.50
Machine shop turnings	4.00 to 4.50
Pipes and flues	7.50 to 8.00
Wrought drillings	4.00 to 4.50
Cast borings	6.00 to 6.25
Stove plate	8.25 to 8.50
Wrought iron arch bars	16.00
Wrought iron piling plate	14.00

CHICAGO

(Delivered in consumers' yards.)

Gross Tons

Old car wheels	$13.00 to 13.50
Old iron rails	13.75 to 14.25
Rerolling rails (5 ft. and over)	12.00 to 12.50
Old steel rails (3 ft. and und.)	11.25 to 11.75
Frogs, switches and guards	10.50 to 11.00
Heavy melting steel	10.50 to 11.00
Shoveling steel	10.00 to 10.50

Net Tons

No. 1 R. R. wrought	$10.25 to 10.75
No. 2 R. R. wrought	9.50 to 10.00
Arch bars and transoms	13.50 to 14.00
Knuckles, couplers and springs	10.75 to 11.25
Shafting	14.50 to 15.00
Iron car axles	20.25 to 20.75
Steel car axles	15.75 to 16.25
Locomotive tires	12.00 to 12.50
Dealers' forge	8.50 to 9.00
Pipe and flues	7.50 to 8.00
No. 1 cast	10.75 to 11.25
No. 1 busheling	8.75 to 9.25
No. 2 busheling	6.75 to 7.25
No. 1 boiler cut	8.25 to 8.75
Boiler punchings	12.00 to 12.50
Cast and mixed borings	5.25 to 5.75
Machine shop turnings	4.75 to 5.00
Railroad malleable	10.75 to 11.25
Agricultural malleable	10.00 to 10.50
Angle bars, splices, etc., iron	13.00 to 13.50
Angle bars, steel	9.75 to 10.25
Stove plate and light cast scrap	8.75 to 9.25

NEW YORK

Gross tons, New York dealers' prices at tidewater, usually for eastern Pennsylvania delivery:

Old car wheels (nominal)	$10.50 to 11.00
Heavy steel axles	15.25 to 15.50
Steel shafting	13.50 to 14.00
No. 1 heavy melting steel	9.50 to 9.70
No. 1 R. R. wrought	12.00 to 12.25
Wrought pipe (not galvanized)	9.00 to 9.25
Cast borings	6.00 to 6.50
Machine shop turnings	5.50 to 6.00
Heavy cast	10.75 to 11.00

Stove plate	7.50 to 8.00
Grate bars	6.25 to 6.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

CINCINNATI

Gross Tons

Old iron rails	$11.50 to 12.00
Old steel re-rolling	10.00 to 10.50
Old iron axles	16.00 to 16.50
Heavy melting scrap	9.00 to 9.50
Relaying rails	18.75 to 19.25

Net Tons

Old No. 1 R. R. wrought	$9.00 to 9.50
Bundled sheet scrap	5.00 to 5.50
No. 1 yard wrought	6.75 to 7.25
No. 1 machine cast	9.50 to 10.00
No. 1 busheling	7.00 to 7.50
Stove plate	6.75 to 7.25
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.25
Heavy turnings	5.25 to 5.75
Mixed cast	7.75 to 8.25
Breakage	5.50 to 6.50
Malleable	7.00 to 7.50

BIRMINGHAM

Old iron axles (light)	$15.00 to 15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	12.50 to 13.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Tram car wheels	10.50 to 11.00
Light cast and stove plate	8.25 to 8.75

BUFFALO

Gross Tons

Heavy melting steel	$10.50 to 11.00
No. 1 R. R. wrought scrap	13.00 to 13.50
No. 1 R. R. and mch. cast scrap	13.00 to 13.50
Old steel axles	17.00 to 17.50
Old iron axles	22.50 to 23.00
Car wheels	12.50 to 13.00
Railroad malleable scrap	12.00 to 12.50
Machine turnings	6.00 to 6.50
Heavy axle turnings	8.00 to 8.75
Cast iron borings	6.25 to 6.75
Low phos. steel scrap	16.50 to 17.00
Old iron rails	15.00 to 15.50
Boiler plate, sheared	12.50 to 13.25
Bundled sheet scrap	8.00 to 8.50
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	10.00 to 10.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50
Wrought pipe	9.50 to 10.00

ST. LOUIS

(Dealers' buying prices.)

Gross Tons

Old car wheels	$11.25 to 11.75
Old iron rails	12.00 to 12.50
Re-rolling rails (5 ft. and over)	11.00 to 11.50
Old steel rails (3 ft. and und.)	10.00 to 10.50
Light sec. relayers (45 pounds and und.) subject to inspec.	24.00 to 24.50
Relaying rails, subject to inspec.	24.00 to 24.50
Frogs, switches and guards	9.50 to 10.00
No. 1 R. R. heavy melting steel	9.50 to 10.00
Shoveling steel	9.00 to 9.50

Net Tons

No. 1 railroad wrought	$10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Arch bars and transoms	13.50 to 14.00
Knuckles, couplers, springs	9.50 to 10.00
Shafting	13.50 to 14.00
Steel car axles	15.00 to 15.50
Iron car axles	19.25 to 19.75
Locomotive tires	11.00 to 11.50
Pipe and flues	7.50 to 8.00
Tank iron and cut boilers	7.25 to 7.75
No. 1 cut busheling	9.00 to 9.50
Cast iron borings	4.50 to 5.00
Machine shop turnings	5.50 to 6.00
Railroad malleable	8.50 to 9.00
Agricultural, malleable	7.00 to 7.50
Stove plates	8.00 to 8.50
Angle splice bars (iron)	11.00 to 11.50
Angle splice bars (steel)	9.00 to 9.50

Store Prices

CINCINNATI

Steel bars 1.95c to 2c; iron bars, 1.85c to 1.90c; plates and shapes, 2.05c to 2.10c; sheets, blue annealed No. 10, 2.20c to 2.25c; black, No. 28, 2.65c; galvanized, No. 28, 3.75c; cold rolled shafting, round, square, hexagon and flat, 53c off.

CLEVELAND

Steel bars, 2.00c; plates and shapes, 2.10c; iron bars, 2.00c; sheets, No. 16 blue annealed, 2.40c; No. 28 black, 2.85c; No. 28 galvanized, 3.95c.

CHICAGO

Steel bars, 1.85c; iron bars, 1.85c; hoops, 2.50c; shapes and plates, 1.95c; No. 10 blue annealed sheets, 2.15c, black, No. 28, 2.80c; galvanized, No. 28, 4.00c.

PHILADELPHIA

Steel bars, 2.00c to 2.05c; structural shapes, 2.00c to 2.10c; plates, 2.00c to 2.10c.

NEW YORK

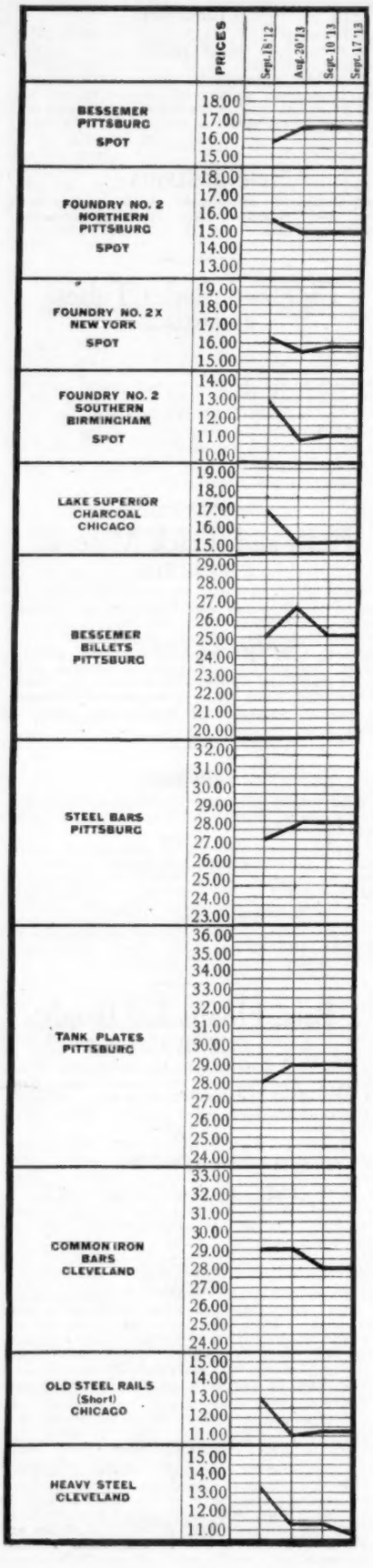
Steel bars, 2.05c; structural shapes, 2.15c; plates, 2.15c.

Awards Ship Contracts

Washington, Sept. 17. (By wire.)—Contracts for the construction of six torpedo boat destroyers were conditionally awarded by Secretary Daniels, yesterday. The Bath Iron Works will build one vessel for $884,000; the Fore River Ship Building Corporation one for $861,000; the New York Ship Building Co., two for $820,000 each, and the William Cramp & Sons Ship & Engine Building Co., two for $881,000 each. Awards are conditioned upon contractors making certain minor modifications of guaranteed fuel consumption. Vessels will be the largest of the kind yet designed, having greater radius of action than any similar ships now in the navy, as well as increased offensive power. Each destroyer will be 310 feet long, 29 feet, 10 inches wide, with displacement of 1,090 tons, and draught of 9 feet, 3 inches. They will burn oil and carry four 4-inch rapid-fire guns and four twin torpedo tubes. Changes in design were made to give both officers and enlisted personnel better quarters and also to increase sea-going efficiency.

Christopher H. Starke, a pioneer of Milwaukee, president of the Milwaukee Bridge Co., and widely known in the dredge, dock and tugboat business on the great lakes, died recently at his country home in Pewaukee, at the age of 79 years. With four brothers, Mr. Starke organized the C. H. Starke Dredge & Dock Co., the best known concern in its line in Milwaukee. Of late years he devoted his efforts to the upbuilding of the Milwaukee Bridge Co.

PRICE CHART



MEN OF THE IRON TRADE

JOHN G. GRIFFITH, of Catasauqua, Pa., is now acting as superintendent of the blast furnace plant of the Carbon Iron & Steel Co., Parryville, Pa.

EDWIN HOWARD, Charlotte, S. C., southern manager of the Mason Machine Works, is preparing to open an office at Greenville, S. C.

H. N. HARRIS has resigned as superintendent of the Southern Engine & Boiler Works, Jackson, Tenn., to take charge of the Jackson Light & Water Co.

WILLIAM H. DONNER, president of the Cambria Steel Co., Johnstown, Pa., has returned to Pittsburgh from Beaumaris, Canada, where he spent his vacation.

A. KAUFFMAN, formerly assistant to the president of the Link-Belt Co., Chicago, has been appointed general manager of the Philadelphia works at Nicetown, Pa.

J. H. SOISTER has resigned his position with the Portsmouth Steel Co., Portsmouth, O., to accept a foremanship with the Kentucky Firebrick Co., Firebrick, Ky.

WILLIAM H. CAMERON, formerly engineer for the Michigan Motor Car Co., of Kalamazoo, Mich., has joined the force of the Lewis Spring & Axle Co., of Jackson, Mich.

MURRAY M. BAKER, of Peoria, Ill., has been made a director and vice president of the Holt-Caterpillar Co., and has assumed entire charge of the business of this corporation at Peoria.

F. N. SPELLER, metallurgical engineer, and H. B. Lynch, superintendent of the McKeesport plant of the National Tube Co., Pittsburgh, were in Vancouver, B. C., last week on business.

ERNEST B. ROSE has been appointed secretary of the new safety department and labor bureau of the Republic Iron & Steel Co., at Youngstown. A new office has been built at the plant to house these departments.

PERCIVAL ROBERTS JR., director of the United States Steel Corporation, upon his return from Europe recently, stated that business conditions there are greatly improved, especially since the settlement of the Balkan question.

R. L. GILLESPIE, formerly assistant in the office of the general manager of sales of the Pennsylvania Steel Co. at Philadelphia, has been made manager of sales of the frog and switch department of the company, with headquarters at Steelton, Pa.

H. S. BELSER has been appointed superintendent of the Chicago Steel Products Co., steel fabricator at Chicago. For six years previous to his coming to Chicago, Mr. Belser was superintendent of the Kansas City Structural Steel Co., Kansas City, Mo.

HENRY L. WRATTEN, for seven years superintendent of the boiler manufacturing plant of S. Freeman & Sons, Racine, Wis., has resigned. Mr. Wratten expects to retire from active business. He has been associated with S. Freeman & Sons for more than 25 years.

SIR WILLIAM MACKENZIE, president of the Canadian Northern railway, has returned to Toronto from a trip to England. It is understood that he has been successful in placing a large amount of first mortgage stock of the company on the London money market.

EDWARD J. WILLIAMS has resigned as disbursing officer of the Isthmian Canal Commission, effective Aug. 30 last, and will henceforth be connected with the Interborough Rapid Transit Co., New York City. Mr. Williams, who is a native of West Salem, Wis., assumed the duties of disbursing officer in 1905, prior to which he filled various similar offices, including paymaster and traveling auditor of the Chicago & Northwestern railway, and comptroller of the city of Evanston, Ill.

CAPTAIN ALFRED MARTIN, who for some time past has been assistant general superintendent for M. A. Hanna & Co., with headquarters at Virginia, Mesabi range, has been transferred to the Menominee range, where he will be general superintendent of the Crystal Falls mines of the company. Before becoming associated with the Hanna corporation, Captain Martin was general superintendent of the Pittsburgh Iron Ore Co., afterwards consolidated with the Hanna interests. His intimate connection with the mining industry covers a period of 38 years.

SAMUEL H. WHITAKER is now associated with Walter-Wallingford & Co., Cincinnati. He was formerly with the Dayton Coal & Iron Co., Dayton, Tenn.

SAMUEL H. WHITAKER

WILLIAM C. TAMPLIN, general manager of the sheet mill of the American Sheet & Tin Plate Co. at Farrell, Pa., has resigned that office and H. M. Steele, of Pittsburgh, special agent for the company, will succeed him. Mr. Tamplin had been manager of the mill for about two years.

E. J. CHAMBERLAIN, president of the Grand Trunk Pacific railroad, after a trip of inspection over the western portion of the line states that it will be impossible to complete the line through the mountains to the Pacific coast by the end of 1914, as was expected, unforeseen difficulties having delayed construction.

KARL LANGREBE, general superintendent of the blast furnace division of the Tennessee Coal, Iron & Railroad Co., returned recently from an extended trip to Detroit, Cleveland, Chicago and New York City, visiting the iron and steel plants throughout that section. Mr. Langrebe, upon his return, said that the fall outlook is splendid.

GUY E. TRIPP, chairman of the board of directors of the Westinghouse Electric & Mfg. Co., East Pittsburgh, is expected to return Sept. 18 from Europe, where he has been visiting the foreign subsidiaries of the Westinghouse company. Directors will meet shortly after his return for dividend action.

JAMES REED has been appointed assistant master car builder of the western district of the New York Central Lines, with headquarters at Englewood, Ill. He succeeds George Thomson, who is made master car builder at Englewood, to succeed J. W. Senger, who has been transferred to the position of master car builder of the eastern district, with headquarters at Collinwood shops, Cleveland.

C. M. SMITH, who has been secretary and treasurer of the Colonial Iron Co. operating the blast furnace plant at Riddlesburg, Pa., has been made president of the company succeeding H. H. Adams,, resigned. Mr. Smith remains treasurer and F. G. Gottsch has been made secretary. Mr. Adams continues at the head of the firm of H. H. Adams & Co. of No. 614 at 165 Broadway, New York City, which acts as selling agent for the products of the Colonial furnace and of other brands of iron and Mr. Smith is associated with him in this business. The New York offices of the Colonial Iron Co., which have been in connection with H. H. Adams & Co. have been removed to No. 2701 in the same building.

RALPH H. SWEETSER was re-elected president and general manager of the Thomas Iron Co., Hokendauqua, Pa., on Tuesday, Sept. 9. The annual meeting of the stockholders of the company was held at Hokendauqua on that date, the report of business for the past year presented and the same board of directors elected to serve for the ensuing year as follows: William H. Hulick, William P. Hardenbergh, of New York City; Fred R. Drake, Andrew D. Chidsey and Ralph H. Sweetser, of Easton, Pa.; J. S. Krause, of Bethlehem, Pa., and Edwin Thomas, of Catasauqua, Pa. Following the stockholders' meeting the new board of directors met and elected officers; besides Mr. Sweetser, Edwin Thomas was elected vice president and James W. Weaver, secretary and treasurer.

JOHN W. RAPP, founder and president of the United Metal Products Co., College Point, L. I., manufacturer of fireproof doors and window frames, recently resigned his position and announced his retirement from that business. Mr. Rapp founded the United Metal Products Co. in 1886 at Sixty-sixth street and Third avenue, Manhattan, manufacturing metal cornices and skylights. The development of that business resulted in a removal of the plant to Ninety-fourth street and First avenue in 1890. Twelve years ago, Mr. Rapp purchased the abandoned plant of the Rhenania silk mills at College Point, where the present plant covering 10 acres is located. The company is capitalized at $8,000,000, and gives employment to 1,300 men. The National Steel & Bronze Co., of Boston, will be the holding concern for the new holders, among whom are Alwin Ball Jr., Campbell Carrington, John McKinnon, C. E. Bailey, Andrew J. Connell and Frank E. Finnegan.

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Eliminating Factors of Uncertainty

Uncertainty in regard to legislation affecting business interests always has a depressing effect, and this is particularly true of the tariff and currency measures. That business men are eager to have these measures disposed of as soon as possible consistent with proper regard for the interests of the country was shown in a striking manner a few days ago at a meeting of the Ohio Bankers' Association. Senator Owen, of Oklahoma, one of the authors of the Glass-Owen currency bill, was addressing the meeting and asked for a showing of hands as to settling the currency question. The vote was practically unanimous in favor of passing the bill with some amendments as soon as possible. All indications are that the currency bill will go through more quickly and by a larger majority than the tariff bill. Hence, as there have already been extended hearings, it is perhaps not too much to hope that the currency bill will be sent to the president before many weeks. The bill, in spite of unfavorable criticism of some features, promises to give relief at least in stopping agitation for an indefinite time.

As to the tariff, probably two weeks more will elapse before the president's signature is attached, but the country has had a pretty definite understanding for some time as to what the main provisions of the bill would be and the changes in conference are not likely to be numerous or important, although there is some reason for hoping that the anti-dumping provision inserted by the house and rejected by the senate will be restored. We do not expect to see any decided manifestation of effects of the tariff bill at any time in the near future. While the bill has been pending, the principal effect has been to make buyers cautious, and this feeling of caution will probably prevail for a number of months. Then it will be determined whether foreign competition is to be serious or not. If fair prosperity should prevail in foreign countries, we shall no doubt have our full share and not be troubled much by the invasion of products of other lands. If, on the other hand, there should be general depression in Europe, the dumping of European products in this country will almost certainly be attempted.

The Master Fluid

In a recent public address, Frank A. Vanderlip, president of the National City Bank of New York, stated that the electrical industry of the United States would require the vast sum of $2,000,000,000 for its development during the next five years. This would equal more than a quarter of the financing requirements for that period of all the business interests of the country.

The prominence of the author as a banker and business man of large affairs gives to his words the weight of competent authority. That such a vast sum of money will be required for a single industry in so short a time, would tend to show that the particular business was in a crude stage of development. A moment's survey of the wonderfully important part that electricity assumes in manufacturing, transportation, communication and, in fact, every phase of industrial efficiency or domestic comfort, renders it difficult to believe that the electrical age is not already here. The great advance in recent years in the employment of electricity in their industry is thoroughly appreciated by iron and steel makers. Among the engineering profession, at least, it is believed, however, that the potentialities of electricity are far from being fully realized and that the utilization of this magic fluid is only in its primal stage.

A hard cash summary of the country's obligations towards this industry tends to suggest a future laden with vast possibilities for commercial and individual betterment to be gained through this invisible, though majestic force.

Helping the Manufacturer

In harmony with the idea frequently expressed in these columns that a state university ought to do something to promote manufacturing as well as agriculture, the Ohio state legislature, at its recent meeting, passed an act to establish an engineering experiment station at Ohio State University. The law provides that the purpose of the station shall be to make technical investigations and to supply engineering data which will tend to increase the economy, efficiency

and safety of the manufacturing, mineral, transportation and other engineering and industrial enterprises of the state and to promote the conservation and utilization of its resources. The station is to be under the control of the board of trustees of the University, who will appoint a director, and there will be an advisory council of seven members to be chosen from the faculty of the college of engineering. The various laboratories of the college of engineering are to be available for the use of the experiment station and any individual, firm or corporation may seek its assistance.

These broad provisions, if wisely worked out, will result in great good. While at present the farmer is able to write to the state university and obtain advice, often based on elaborate investigation, the manufacturer does not have this privilege, and often it is impossible for a manufacturer to conduct investigations necessary to determine certain facts. This may be due to lack of equipment, as well as to inability to expend the necessary amount of money. We congratulate the university upon entering into a greater field of usefulness.

Wages and Hours of Labor

A study of the union scale of wages and hours of labor for something over 40 different trades in 39 important industrial cities throughout the United States, covering a period of six years, from 1907 to 1912, inclusive, as compiled by the United States Bureau of Labor Statistics, and published recently in Bulletin No. 131, reveals some very interesting facts.

Out of 50 different occupations, the average hours of labor per week in the 39 different cities in 1912 had decreased, as compared to 1907, in each instance, with but one exception, where there had been no change, while the highest per cent decrease was 17.7. On the other hand, each of these occupations averaged for all the different centers shows in wages per hour an increase in 1912, as compared with 1907, in one case the per cent increase running to 40.7.

In the metal trades the relative hours of labor per week and the relative rate of wages per hour had changed from 1907 to 1912, as follows:

Occupation.	Per Cent Decrease in Hours per Week, 1907 to 1912.	Per Cent Increase in Wages per Hour, 1907 to 1912.
Blacksmiths	2.1	10.3
Blacksmiths' helpers	2.2	16.4
Boilermakers	1.6	15.6
Boilermakers' helpers	2.4	16.9
Coremakers	2.3	13.8
Machinists	2.2	9.6
Molders, iron	1.3	7.4
Patternmakers, wood	2.8	8.3

The 39 cities included in this report are important industrial cities, representing 32 states and including one-fifth of the total number of people, two-fifths of the urban population and approximately one-third of the total number engaged in gainful occupations (not including those in agricultural pursuits) in continental United States.

Going back and viewing the change in hours of labor and wages from 1890 to 1907, the following information for the metal trades has been compiled from the payrolls of employers in some 60 cities:

Occupation.	Per Cent Decrease in Hours per Week, 1890 to 1907.	Per Cent Increase in Wages per Hour, 1890 to 1907.
Blacksmiths	2.7	16.4
Boilermakers	6.4	23.8
Coremakers	6.2	23.8
Machinists	7.0	19.8
Molders, iron	5.6	26.2
Patternmakers, wood	6.7	26.8

An interesting table is the following, showing the average wage for some of the different branches of the metal trades and the highest and lowest wage paid for each branch, when considering the 39 cities which were included in the study of wage conditions:

Occupation.	Average Wage Per Hour.		Highest Wage Per Hour.		Lowest Wage Per Hour.	
	1907. Cts.	1912. Cts.	1907. Cts.	1912. Cts.	1907. Cts.	1912. Cts.
Blacksmiths	34.36	40.67	45.00	50.00	25.47	29.04
Blacksmiths' helpers	21.69	25.52	33.33	37.50	16.00	18.00
Boiler makers	34.85	40.08	50.00	62.50	24.45	28.00
Boiler makers' helpers	22.33	26.19	35.00	40.00	13.00	16.67
Core makers	32.21	35.54	44.44	50.00	18.00	25.00
Machinists	33.80	37.02	50.00	60.00	20.00	25.00
Molders, iron	34.12	36.22	44.44	50.00	25.00	25.00
Pattern makers, wood	34.21	43.65	55.56	62.50	25.00	35.00

The above statistics form a most effective answer to the arguments of the labor agitator who insists that the condition of the workingman is constantly growing worse.

Ore Production and Consumption

The report of the United States Geological Survey for 1912 shows that 55,150,147 tons of iron ore were mined in the country, as compared with 43,876,552 tons mined in 1911. In those two years, the tonnage of ore mined was 99,026,699, and in the same years the blast furnaces of the country produced 53,376,484 tons of pig iron. Bearing these figures in mind, and also recalling that the present production of pig iron is at the rate of 30,000,000 tons per year, while in the first half of this year the production was 16,488,602 tons, and also recognizing that a very large part of the ore mined, especially in the south, is below 50 per cent iron, it would seem that iron mining is not progressing at too rapid a rate, but is, in fact, hardly keeping up with the production of pig iron.

Of course, the stock piles can be drawn upon or added to from year to year, according to the demand for ore. The Geological Survey collects statistics of iron ore production, while THE IRON TRADE REVIEW'S annual compilation refers to shipments from the Lake Superior region. Our compilation for 1912 shows that the shipments from the Lake Superior region were 1,737,748 tons more than the amount mined. Hence that tonnage must have been taken from the stock piles. In 1911, however, the tonnage mined was 2,879,674 tons more than the shipments. Hence that addition was made to the stock piles. While in other parts of the country, probably, mining for future use is not conducted to the extent that it is on the Lake Superior ranges, there is some stock piling from time to time. Then, of course, there is the carrying of stock in furnace yards concerning which, unfortunately, there are no statistics. Iron ore remaining on lower lake docks is also, of course, a factor. On the whole, it seems that the mining and consuming of ore are pretty well balanced.

NEW BUSINESS

The machinery market, as a whole, has shown slight improvement during the past week, although the change has been spotted, both in the way of classes of equipment and dealers. There has not been much inquiry for large units, the main activity being in the way of single tools or small lot accessory equipment. Machinery houses generally are keeping their salesmen out scouring the country for business and exerting their best efforts to secure orders. Now that a rest from tariff legislation appears imminent, much speculation exists as to the effects of adjustments.

In New York, the demand for machinery continues quiet and the market is quite without color. The volume of business booked during the first two weeks of September was considerably smaller than for the like period in August. The volume of inquiry, which was reported improved last week, has again dropped off to some extent. Dealers who engage in the export trade are also assiduously developing this department of their business, with the result that machinery sales to foreign buyers are increasing in volume. Several representatives of European concerns are here inquiring for machinery, mostly of a special nature. Among these is the engineer of one of the largest plants in Austria.

In Pittsburgh, machine tool dealers report that there has been some improvement in business this month, although the majority of pending negotiations involve only single tools, and September, thus far, has not showed the snap in buying that many had expected. Builders of heavy rolling mill machinery are operating plants at maximum capacity, but say no important projects are being considered in that territory.

In Chicago, August was a rather disappointing month to the machinery trade, but there are indications that September will show considerable improvement. Within the past few days, sales have picked up slightly, although at present the total volume of business is greatly curtailed. The railroads have been practically out of the market for 90 days.

In Cleveland, a few dealers in machinery and machine tools report some improvement, while the majority state they have noted little if any change. Second hand business is somewhat better, while supplies and electrical equipment continue active.

In Cincinnati, the machinery market has been characterized during the past week by a slightly better business in most lines. Machine tool builders appear to have taken a few orders recently, but mostly in small lots, generally single machines at a time. Business in this branch of the trade is also scattered, some firms being fairly busy, while others state that they have not received any orders for a long time. Transactions during August, as a whole, were extremely disappointing, and when compared with the same month last year, show a decided falling off in the percentage of business placed. Second hand dealers state that their business is far from satisfactory. Makers of small electrical equipment and refrigerating machinery are fairly busy, especially the latter. All special machinery is apparently in good demand at the present time. Boiler and tank manufacturers report a scattered business, but as a whole, somewhat encouraging prospects for a more satisfactory month during September.

COLORADO

DENVER.—The Vulcan Iron Works, manufacturing mining and irrigation machinery, has recently secured a large government contract, which with the regular work will keep the shop busy for the rest of the year.

CONNECTICUT

BRIDGEPORT.—The Connecticut Electric Mfg. Co., of which A. H. and I. B. Trumbull are the controlling owners, has purchased the American Cyclecar Co., Detroit, which was recently organized. The new car will be manufactured in a new plant to be erected in Bridgeport.

HAMDEN.—The Mt. Carmel Brass Foundry Works has been incorporated; $9,100; by R. Biondi, president, and A. Pfeiffer, secretary and treasurer.

NEW HAVEN.—The New Haven Iron & Steel Co. expects to start operations Oct. 1, with a working force of 200 men, after a temporary shut-down for improvements and repairs.

NEW HAVEN.—The Birmingham Iron Foundry Co. recently purchased a valuable tract of land on Main street, 140 x 280 feet. The company has not, as yet, announced its plans in connection with this purchase.

DISTRICT OF COLUMBIA

WASHINGTON.—Bids will be received up to Sept. 22 at the office of Indian affairs for the construction of two steel highway bridges across the Gile and San Carlos rivers, San Carlos Indian reservation, Ariz.

WASHINGTON.—The Bureau of Supplies and Accounts, Navy Department, will receive bids until Sept. 21 for furnishing the following supplies: Schedule 5817, railroad bolts, spikes, frogs, switches, rails, etc.; Schedule 5826, crucible cast steel shapes, etc.; Schedule 5815, operating mechanisms. Bids will be received until Oct. 7 for one steam-driven vertical pump, Schedule 5831.

WASHINGTON.—Proposals for furnishing motor-driven centrifugal pumps, valves, piping, hydraulic operating tables, traveling cranes, air compressor and switchboards, complete with all electrical instruments and connections, will be received until Oct. 6 by the general purchasing officer, Isthmian Canal commission. Further information relating to these requirements (Circular No. 796) may be obtained on application to F. C. Boggs, major, Corps of Engineers, U. S. A., general purchasing officer.

IDAHO

POCATELLO.—Contract for the construction of machine shop for the Oregon Short Line here has been let to P. J. Morgan, of Salt Lake at approximately $100,000.

ST. MARIES.—With a capitalization of $100,000 the Marble Creek Valley Railroad Co. will build a line from Clarkia to Pocona, 20 miles, and from Buzwell creek to Pierce City, 25 miles. Headquarters in this city. Directors of road include Fred Herrick and W. D. Harrigan.

ILLINOIS

GRAFTON. — The Rippley Mfg. & Steel Boat Co. has been incorporated; $15,000; by F. Rippley, W. J. Brower and W. Rippley.

HARVARD.—Hunt, Helm, Ferris & Co. are erecting a new building 60 x 120 feet, a portion of which will be used as a galvanizing plant and the rest for manufacturing purposes.

JACKSONVILLE. — The Illinois Steel Bridge Co. has recently added considerable machinery and has greatly increased the facilities of its shop.

ROCK ISLAND.—The Rock Island Mfg.

Co. has added a two-story building to its plant, the upper part of the structure to be used for office purposes and the first floor will be fitted up for the manufacture of vises.

SOUTH CHICAGO.—Fire in the machine shops of the New York, Chicago & St. Louis railroad recently caused a loss of $500,000. Ten locomotives in the building at the time, together with other machinery, were ruined by the flames. The closing down of the shops for repairs will throw 700 men out of employment.

INDIANA

ANDERSON.—It is rumored that the Anderson Tool Co. contemplates the erection of a new building in the near future.

ANDERSON.—The Dice Engine Co. advises it has taken over the business of the Anderson Motor Co., and will continue the manufacture of engines until spring, and no new equipment will be bought.

ELKHART.—It is announced that John C. Boss, patentee of a new brick drying machine, will engage in the manufacture of structural iron frames for his new device. The system he has invented requires no plant outside of the steel frame, the manufacturing being done in the open.

EVANSVILLE.—The International Steel & Iron Co. will rebuild its plant, which was recently destroyed by fire, entailing a loss of $50,000.

LAFAYETTE.—The commissioners of Tippecanoe county appropriated $260,000 to cover the construction of the new Main street bridge. Of this amount, $65,000 is available this year.

HUNTINGTON.—Machinery is being placed in the plant of the Huntington Machine & Foundry Co., and operations will be started in a short time. C. F. Heinss and H. E. Oscamp, of Cincinnati, are owners of the concern.

INDIANAPOLIS. — The Central States Bridge Co. has been awarded the contract for the Halderman bridge at Verona at $7,500.

INDIANAPOLIS.—The Smelser Engine & Machine Works has awarded the contract for the erection of its new fireproof factory to be located on Mars Hill. It will cover 12,000 square feet of floor space.

INDIANAPOLIS.—The Ray Harroun Co. will erect a new factory containing 80,000 feet of floor space, equipped with the latest automatic machinery for the manufacture of carburetors and other accessories, estimated to cost $200,000. The company has increased its capital from $50,000 to $600,000 to make these improvements possible.

IOWA

PERRY.—It is announced by President Speers, of the Shorthill Steel & Iron Works, that that company is dismantling its old plant at Marshalltown. The machinery, tools and material will be shipped to Perry, where the company has completed a new plant.

KENTUCKY

CARROLLTON.—A machine shop is being built and equipped by the Wood Auto & Machine Co. Equipment purchases are now being made.

CLOVERPORT. — The Cloverport Bolt & Machine Co. has been reorganized. William Pate is general manager. A new plant will be erected, including a complete gray iron foundry.

GLASGOW.—The Dickinson Brothers Motor Co. has been incorporated; $12,000; by B. Dickinson, B. G. Dickinson and T. D. Dickinson.

HAZARD.—The Kentucky Block Coal Co. has been incorporated with $30,000 capital stock and is now in the market for equipment for producing 1,000 tons a day. J. B. Allen is manager.

MARION.—The town will vote on a $25,000 bond issue in November for a waterworks system.

MIDDLESBORO.—W. Godfrey Hunter is organizing a company for the establishment of a street car system, with interurban lines connecting with other coal mining towns.

STURGIS.—The city has created a franchise for the operation of a water-works system, and a local company is being formed to purchase it.

MAINE

RUMFORD.—The F. L. H. Machine Co. has been incorporated to carry on a general manufacturing and mercantile business; $50,000; by J. Y. Harris and R. W. Harris, both of Rumford.

MASSACHUSETTS

BOSTON.—The Laconia Car Co., with main offices at 141 Milk street, and plants at Laconia, N. H., has purchased eight acres on which it will erect an addition to its present plant.

EAST SPRINGFIELD.—A large addition is planned by the Stevens-Duryea Automobile Co.

MICHIGAN

BENTON HARBOR. — The Bremer-Wilson Mfg. Co., recently organized with a capital stock of $150,000, will establish a plant for the manufacture of automobile accessories of all kinds. The plans for the factory include a bronze foundry, 25 x 60 feet.

DETROIT.—The Swedish Crucible Steel Co. has let contracts for a new foundry building to be erected at Butler avenue and the Grand Trunk railroad.

GRAND RAPIDS.—The Merchants' Heat & Light Co. and the People's Light & Heat Co. of Indianapolis, both properties of the American Public Utilities Co., have been merged. The Merchants company has taken over the other and increased its own capital to $1,500,000. C. B. Kelsey is president of the latter company.

JACKSON.—The Phillips Metallic Hose Co. has been incorporated with a capital stock of $100,000 to manufacture metallic hose to take the place of rubber hose for coupling cars.

KALAMAZOO.—Cook's Standard Tool Co. of Kalamazoo and the National Cable & Mfg. Co., of Niles, have consolidated under the corporate name of the National Standard Co.

LUDINGTON.—H. M. Hallett & Co., a new million dollar concern, will erect a plant for the manufacture of polishes for automobiles, furniture, etc. J. S. Stearns is associated with Mr. Hallett in the enterprise.

MANISTIQUE. — The Lake Superior Iron & Chemical Co. has successfully effected a reorganization and it is understood that $700,000 will be available for improving the Manistique works. A retort plant and saw mill such as the corporation owns at Newberry, Mich., will be built.

TRAVERSE CITY.—The city authorities are figuring on a new steel bridge over the Boardman river.

MINNESOTA

ALBERT LEA.—A deal involving the purchase of a three-acre tract of land in this city was closed recently by the Kemper Ode Gas Engine Co. Plans for a brick, concrete and steel factory building were placed today, and work will start as soon as material can be obtained.

WILLMAR.—The Oman Machine Works Co. has been incorporated to manufacture all kinds of machinery, instruments, mechanical appliances, etc.; $15,000; by J. E. Johnson, R. B. Oman, both of Willmar, and O. L. Erickson, of Svea.

MISSOURI

ST. LOUIS.—The Banner Iron Works has installed an electric traveling crane and expects to erect a crane runway from the structural shop out into the yard.

ST. LOUIS.—Curtis & Co. Mfg. Co., St. Louis, has recently completed a new addition to its steel foundry 100 x 150 feet. This company is also working on an addition to its manganese steel department.

ST. LOUIS.—The Brennan Construction Co. will probably build the entire eastern railroad approach to the municipal bridge and a belt line extending to the county line separating St. Clair and Madison counties.

ST. LOUIS.—The American Boiler Works has changed its name to the American Iron Works and has purchased a new shop. The new building has a floor space of 10,700 square feet in which up-to-date equipment will be placed.

MONTANA

BUTTE.—Plans have been completed for building a $200,000 Milwaukee depot here.

CONRAD.—The Lange Engineering & Construction Co. of Great Falls has been awarded the contract for constructing a flax mill here.

GREAT FALLS.—The Oxo-Burner Co. has been incorporated here by John M. Ellis et al. for $20,000, the object being to make and sell patented burners.

KELLOGG. — The contract for sewers in this city has been awarded by the council to Parrott Bros. Co., Baker City, Ore., for $20,400.

LEWISTON.—The Milwaukee is clearing ground for new machine shops and round house for division terminals.

LIVINGSTON.—The Great Eastern Milling Co. has been organized here for $500,000 by Lee Brown and others.

MISSOULA.—Plans have been completed for a bridge over the Blackfoot river, to be constructed by Missoula and Ravalli counties.

OROFINO.—The Orofino Portland Cement Co. has awarded the contract for a $20,000 machine shop to Petram & Lotterberger of Spokane. Work will begin at once.

NEW JERSEY

BAYONNE. — The Columbia Metal Hose Works has been incorporated to manufacture hose or tubing, metal molding, metal stamping, etc.; $15,000; by J. E. Wattell, L. Sussman, A. Wattell, and M. I. Marshak, all of Bayonne.

CAMDEN.—The Penn Pressed Metal Co. has been incorporated to manufacture, sell and trade in all kinds of metal goods; $25,000; by T. A. Kuntz, J. Disbrow Baker and T. S. Saurman.

TRENTON.—The office building of the Trenton Malleable Iron Co., situated on New York avenue, was damaged by fire on Sept. 4.

TRENTON.—The National Porcelain Co. has installed a new mechanical apparatus in its plant for making spark plugs for automobiles.

TRENTON.—The Motor Shop, located at 636-640 East State street, has been incorporated to manufacture and sell automobiles, motors, etc.; $25,000; by Robert C. Manning, Joseph I. Bodine and Walter S. Cox Jr. The company recently erected a four-story brick building for its manufacturing plant.

NEW YORK

AUBURN.—An addition 60 x 150 feet is being planned by Henry & Allen. Drop hammers, presses and tools will be required.

BROOKLYN.—The E. R. Collins Mfg. Co., Inc., has been incorporated to manufacture iron and steel articles, etc.; $5,000; by E. R. Collins, Baker avenue and L. Heirs, Broadway, both of Dunton, N. Y., and W. E. J. Collins, Richmond Hill, N. Y.

BUFFALO.—The Pratt & Letchworth Co. is preparing to erect a core building of brick and steel, two stories, 94 x 112 feet. The Osborn Engineering Co., Cleveland, has drawn the plans. The Buffalo Structural Steel Co. has been awarded the steel contract.

DUNKIRK.—The Atlas Crucible Steel Co. has increased its capital stock from $150,000 to $1,500,000.

HORNELL.—The Swift Machinery Co. has been incorporated with a capital stock of $30,000 for manufacturing special machinery and plans to later erect a factory.

MEDINA.—The Medina Iron & Brass Co. is planning to erect a foundry, 90 x 115 feet, one story.

MILLERTON.—The Torrey-Eggleston Bushing Co., Inc., has been incorporated to manufacture trolley wheels, bushings, etc.; $40,000; by F. B. Torrey, Richmond, Me.; L. J. Eggleston, Bath, Me., and D. J. Gleason, Millerton, N. Y.

NEW YORK CITY.—The Sisson Engineering & Construction Co. has been incorporated; $100,000; by W. S. Innis, New York City.

NEW YORK CITY. — The Coleman Gas Producer Co. has been incorporated to manufacture and deal in gas generators and machines for the production of gas and vapors in connection with explosive engines with a capital stock of $1,000,000.

NEW YORK CITY.—The New York Ornamental Iron Works, Inc., has been incorporated; $1,000; by J. L. Berstein and A. Miller, both of 5 Beekman street, and P. Tanner, 315 East Twenty-second street, all of New York City.

ONEIDA.—The Parry Corporation has been incorporated to deal in iron, steel, etc.; $30,000; by W. B. Parry, 12 Seymour avenue and H. B. Parry, 115½ Thomas street, both of Utica and F. D. Parry, 79 Miller street, New York City.

QUEENS. — The Barker-Haines Steel Co., Inc., has been incorporated; $4,500; by C. E. Barker, 80 Garfield avenue, Richmond Hill, N. Y., and William Glass, 189 Division street, Brooklyn, N. Y.

OHIO

AKRON.—The Kraus-Kirn Co. is having plans prepared for a warehouse 48 x 165 feet, three stories. Estimated cost $30,000.

ATHENS.—The Athens Stove Co. has been incorporated to deal in all kinds of stoves and house furnishings; $25,000; by H. M. Harding, E. R. Walker, G. H. Hewitt, A. E. Fallon, M. P. Totman, J. Halliday Cline and C. B. Hopkins.

CANTON.—The Hurst Mfg. Co., manufacturer of gasoline engines, has increased its capital and contemplates the erection of additions and improvements to its plant.

CANTON.—The Bacher Iron & Steel Co. has been incorporated; $100,000; by P. Bacher, H. Bacher, S. J. Pruden, J. V. Price and T. M. Lee.

CINCINNATI. — The Reliance Engineering Co. has let the contract for the municipal gas plant at Lebanon, O., to the Western Gas Construction Co., of Ft. Wayne, Ind.

CINCINNATI.—An inquiry for some second hand equipment has been sent out by Riley & Richards, 218 Fosdick street, relative to establishing a small bar and sheet mill.

CINCINNATI.—The Modern Machine Tool Co. advises a recent increase in capital is to add to facilities to increase output. No new buildings will be erected, but additional equipment will be bought, the details of this not being determined yet.

CINCINNATI.—If business conditions during the next few months warrant such an action, the Lunkenheimer Co. will erect a new iron foundry, 150 x 300 feet, at its works in Fairmount, that city, to cost from $150,000 to $200,000. Bert Baldwin & Co., engineers, of Cincinnati, are in charge of the work.

CINCINNATI. — Estimates for the new building of the Gedge-Gray Co., machinery manufacturer, to be located in Lockland, a suburb of Cincinnati, were received until Sept. 15 by Architects Robertson & Fahnestock. The building will be 68 x 161 feet, one story.

CINCINNATI. — Henry Niebling has secured the contract for installing the ice cooling and refrigerating plant in the new 12-story office building of the Cincinnati & Suburban Bell Telephone Co., that city. The contract was let by Architect Harry Hake, Cincinnati, who is in charge of the erection of the building.

CINCINNATI.—The engineering department of the Cincinnati Car Co., Winton Place, Cincinnati, is completing plans for addition to its plant to be used as an assembling department, and to cost $30,000. A steel plant adjoining the main building of the car company has been purchased, which will be altered, and equipment will be installed as soon as possible.

CLEVELAND.—The Cleveland Folding Machine Co. has been incorporated to manufacture and deal in machinery of all kinds; $25,000; by W. W. White, T. H. Garry, E. F. Hutchee, R. G. McCreary and C. A. Flynn.

CLEVELAND.—Plans are being drawn for the Climax Cleaner Co. for a new factory building to be erected on a site of two acres recently bought on West 110th street. The present plant on Columbus road will be sold.

CLEVELAND.—The Langer Machine Co. has been incorporated to manufacture wrapping and labor-saving machinery; $200,000; by C. I. Richert, C. B. Mehard, C. D. Scully, P. M. Sloan and C. T. Sanders, all of Pittsburgh.

COLUMBUS.—The Moline Plow Co. has started construction work on its four-story reinforced concrete warehouse. The building is estimated to cost $80,000 when completed.

HAMILTON.—The county emergency commission will take initial steps towards the construction of a permanent High and Main street bridge in this city and a permanent bridge in Middletown. The High and Main street bridge will be 650 feet long.

IRONDALE. — The contract for a large brick plant for the Ohio Pipe Line Co., which will be 118 x 215 feet, and will contain 16 kilns, has been awarded to Nicholls Brothers and Edward Fenwick of Wellsburg and William Jackson, of Steubenville. A year will be required to complete the work.

LIMA.—The Lima Tool & Supply Co. has been incorporated to deal in engineers' and manufacturers' supplies; $10,000; by E. R. Smith, president; W. L. Sutton, vice president; F. C. McLeod, secretary and treasurer.

PIQUA.—Commissioners have awarded contracts for the superstructures of several bridges in different parts of the county, including a concrete bridge over the Stillwater river at Covington.

PORTSMOUTH.—The Mt. Vernon Bridge Co. has been awarded the contract for the new Scioto river bridge at $166,200.

TIFFIN.—A new steel bridge is to be constructed at St. Johns to replace the wooden one which collapsed last week. Plans are being prepared by county engineer. The contract will be awarded under the emergency law.

WOOSTER.—The Buckeye Aluminum Co. has increased its capital stock from $150,000 to $250,000.

YOUNGSTOWN.—The Youngstown Foundry & Machine Co. has given a contract to the Hunter Construction Co. for an addition 70 x 100 feet, steel construction. A 15-ton electric crane is included in the equipment.

ZANESVILLE.—Louis P. Weidig has purchased a site for his proposed foundry here and awarded the building contract to P. Mast.

ZANESVILLE.—The J. A. Swingle Contracting Co., of this city, has been awarded the contract for the new seven-span concrete bridge at Sixth street. Estimated cost $172,000.

OREGON

BAY POINT.—The C. A. Smith Lumber Co. suffered a $1,000,000 fire loss in a recent blaze.

EUGENE.—The water board is urging the city council to sell $100,000 in water bonds to connect the present system up with the old city wells.

FRIEND.—The lumber mill and yard of J. A. Olney has been destroyed by fire.

MEDFORD. — The Benton Lumber Co., Redding, Cal., has purchased a large body of timber on Foots creek near here and will erect a $25,000 fruit box factory.

PENDLETON.—The contract for building the concrete pipe line for the water system has been awarded to the A. S. Bent Construction Co., of Los Angeles, for $138,564.

PORTLAND. — The Beaver State Hotel Corporation has leased a site corner and is planning to erect a $250,000 fireproof building shortly after Jan. 1, 1914.

PORTLAND. — Articles of incorporation have been filed by H. E. Harris, Milton B. Henderson and A. T. Lewis for the Harris Ice Machine Works. Capitalization $50,000.

PORTLAND.—Contract for furnishing the city with 1,000 tons of 8-inch cast iron pipe has been awarded to United States Cast Iron Pipe & Foundry Co. at $30,750; contract for 125 tons of 6-inch cast iron pipe was awarded to American Cast Iron Pipe Co. at $3,856; for 100,000 pounds of cast iron specials to Phoenix Iron Works at $2,500.

PENNSYLVANIA

APOLLO.—The Apollo Steel Co., which recently completed a modern plant for the manufacture of sheets, has ordered a 54-inch roller leveling machine from the National Roll & Foundry Co., Avonmore, Pa.

AVONMORE.—Business men of the Allegheny and Kiskiminetas valleys, headed by Charles Biehl, of Tarentum, are reorganizing the old Keystone Steel Foundry Co. to form the Kiski Steel Casting Co. The plant of the company, idle several years, is being made ready for the resumption of operations in the near future. H. C. Barnhart, Marion, O., general superintendent, will have charge of the plant.

BRIDGEVILLE.—The Universal Rolling Mill Co. has ordered a 26-inch finishing mill and two single shears for shearing heavy plate from the National Roll & Foundry Co., Avonmore, Pa.

CHESTER.—The Penn Pattern Co. recently completed a large pattern for a stern post casting to be used in the construction of the United States battleship Pennsylvania being built at the Newport News, Va., ship yard. The pattern is 10 x 50 feet.

COLUMBIA.—Application was recently made for the incorporation of the Myers Machine Co. This industry was started by C. S. Myers in 1909 for the manufacture of machine tools, and has grown steadily, at the present time occupying 5,000 square feet of floor space. It is planned to install additional machinery.

DERRY.—The Pennsylvania railway has ordered two 125-horsepower boilers from the Heine Safety Boiler Co., St. Louis, for installation in the Hillside pumping station at this city.

ERIE.—Construction of the machine shop addition to the plant of the General Electric Co. is being hurried to have the structure, 400 x 800 feet, ready for use Oct. 1.

ERIE.—The Sims Heating Co. is erecting a machine shop, 100 x 200 feet, two stories.

FRANKLIN.—The plant and equipment of the Franklin Foundry Co. has been sold at receiver's sale to three of the former partners for $5,600. The purchasers are Mrs. C. A. Kahle and U. C. Kenedy, of Oil City, and John Morrison, of Franklin.

GREENSBURG.—The Greensburg Coal & Coke Co., capitalized at $30,000, has been incorporated by Alexander Coulter, H. W. Coulter and W. A. Coulter, all of this city.

HARRISBURG.—The Kerk-Matlack Metals Co. has been incorporated with a capital of $6,000, by C. K. Kerk, Wayne, Pa., J. B. Matlack, Malvern, Pa., and John H. Nash, Philadelphia.

HARRISBURG. — Notices of increase of stock have been filed at the Pennsylvania state capitol by the Wyoming Shovel Co., Scranton, $100,000 to $300,000, and Knox Pressed & Welded Steel Co., Pittsburgh, $5,000 to $200,000.

PHILADELPHIA.—George Oldham & Sons are having plans prepared for a two-story addition and power house.

PHILADELPHIA.—Irwin & Leighton have been granted a permit to erect a 10-story, 231 x 312-foot service building for the Ford Motor Car Co. at the northwest corner of Broad street and Lehigh avenue.

PHILADELPHIA.—The Henry A. Hitner's Sons Co. advises the recent fire in its establishment did damage close to $75,000, fully covered by insurance. As soon as adjustment is made it is intended to rebuild and equip in better form than before the fire.

PHILADELPHIA.—The city has advertised for bids for a municipal repair shop for the department of public safety to be erected at Eleventh and Reed streets. A boiler, engine and generator plant will be installed on the first floor and also a blacksmith shop adjoining the main building. The structure will be 115 x 258 feet, three stories. Ballinger & Perot, architects.

PITTSBURGH.—The Riter-Conley Mfg. Co. has received a contract from the Pennsylvania Co., Pittsburgh, for a steel stack, seven feet in diameter and 150 feet in height.

PITTSBURGH.—A 125-horsepower boiler, furnished by the Heine Safety Boiler Co., St. Louis, is being installed in the Muncipal hospital.

PITTSBURGH.—The Otis Elevator Co. has received an order for the installation of four electric elevators in the Allegheny county court house, to replace lifts operated by hydraulic power. Improvement will cost $24,980.

PITTSBURGH.—The Wayman-Aiken Electric & Mfg. Co. has been incorporated; gas engines, etc.; $6,000; by T. A. Wayman and G. A. Aiken, both of Pittsburgh and G. E. Wayman, Sewickley.

PITTSBURGH.—The H. K. Porter Co. has recently delivered three high power switching locomotives to the Monongahela Connecting Railway Co., a subsidiary of the Jones & Laughlin Steel Co. Engines will be used for switching and transfer service.

PITTSBURGH.—The Kerr Turbine Co., 2201 Oliver building, has received an order for two 1,000-horsepower Economy condensing turbines to drive 20,000,000-gallon centrifugal pumps through Falk reduction gears for installation in one of the steel mills in this district by the Wilson-Snyder Centrifugal Pump Co.

PITTSBURGH.—Samuel Diescher & Sons, engineers, Farmers' Bank building, have completed preliminary plans for a new plant for the Franklin Rolling Mill Co., Franklin, Pa., works of which were partially destroyed by fire last May. Officials of the company have not yet decided upon a site. The company is a subsidiary of the Chicago Railway Equipment Co.

PITTSBURGH.—The Standard Fire Brick Co., which has recently completed a new plant at Empire, O., has opened offices in the Diamond Bank building, this city, with E. W. Ballentyne in charge. The new plant has a capacity of 50,000 brick daily, and is equipped for the manufacture of paving blocks, fire brick and fire clay. The plant is operated entirely by electric drive.

PITTSBURGH. — The McClintic-Marshall Construction Co. is progressing rapidly with the erection of a new plant for the Crucible Steel Co. of America, at Syracuse, N. Y. Foundations for the rolling mill, machine shop and hammer shop are completed and erection work has commenced. The subsidiary com-

pany will be known as the Syracuse Crucible Steel Co.

SHARON.—The Sharon Foundry Co. expects to have plans prepared soon for its new plant at Wheatland. Three fireproof buildings, 50 x 100 feet, will take the place of the pattern shop recently destroyed by fire.

TACONY.—The Philadelphia Steel & Forge Co. recently installed a new power plant in its rolling mill department, which will increase the output of finished bars 2,000 tons per month.

RHODE ISLAND

PROVIDENCE. — The Allen Wrench & Tool Co. has been incorporated to manufacture a new tool and machinery; $100,000; by F. R. Allen, W. E. Davis and W. H. Thornley, all of Providence.

WOONSOCKET.—The Clifton Mfg. Co. has begun work on an addition to its boiler house and on a new economizer building and a new engine room. Foundations are being constructed for three new boilers, a new condenser and a new engine.

TENNESSEE

KNOXVILLE.—A flour mill costing $25,000 and constructed of reinforced concrete, will be erected by Lewis & Adcock. The equipment will be ordered shortly.

LEWISBURG. — The municipality is considering issuing $25,000 of bonds for a water system.

MORRISTOWN.—A knitting mill will be built and equipped by the Holston Mfg. Co., Lenoir City, Tenn. Power and special equipment will be needed.

UTAH

POCATELLO.—The Lynch-Cannon Engineering Co. has been awarded contract for reconstruction of part of the Oregon Short Line shops at this place, which were recently destroyed by fire. The contract price is said to be $125,000, work to be completed by May 1, 1914.

VIRGINIA

CHARLOTTESVILLE. — The Albemarle Stove & Machine Co., Inc., has been incorporated; $50,000; by W. G. Moran, president; S. Kaufman, vice president, and E. S. Wilder, secretary and treasurer.

WASHINGTON

BELLINGHAM.—The shingle mill of the Clearbrook Lumber Co. was destroyed with a loss of $7,000. Mill is located 15 miles north of here.

BREMERTON. — Authority has been received at the navy yard for constructing a 60-foot stern wheel river boat to be used by the army on the Columbia river.

CHEHALIS.—The Automatic Electric Controller Co. has been incorporated for $100,000 by C. J. Harrison, S. A. Davis and others.

EATONVILLE. — Town Clerk Chas. C. Briggs will receive bids Sept. 26 for construction of hydro-electric plant according to specifications. Plant to consist of power house with complete electrical equipment, concrete dam, wood stave pipe and turbines.

GRANITE FALLS. — The council has awarded the contract for a sewer system to the Atlas Construction Co., of Everett for $35,209.

HILLYARD.—Council has passed an ordinance to install 4 and 6-inch metal water mains throughout the city at an approximate cost of $91,740.

OLYMPIA.—Bids are requested at once for constructing nine miles of Olympia highway. The sum of $111,000 has been appropriated for this road.

SEATTLE.—The county commissioners have agreed to appropriate $25,000 for bridges on Sixth avenue.

SEATTLE.—John Arthur and C. R. Berney have incorporated the Crescent Oil Co. for $500,000.

SEATTLE.—The Western Pacific Oil Co. has been incorporated for $1,000,000 by Herbert S. Upper and Lee J. Brawley.

SEATTLE. — The Peary lumber mill at South Alki has been purchased by J. E. Muffley of Spokane. It will be enlarged by addition of new equipment.

SEATTLE.—The city engineer has recommended that the contract for laying sewers in Palatine avenue be awarded to Frasca & Colucco, of this city for $87,000.

SEATTLE.—C. J. Nichols, architect, has completed plans for a $600,000 10-story steel and terra cotta apartment for C. E. McKelvey, of Washington apartments.

SEATTLE.—This county (King) and Pierce county have reached an agreement for controlling the waters of White and Stuck rivers. The work will involve the construction of a steel and concrete dam.

SEATTLE. — Louis Burton & Co. have awarded contract to McRae Bros., Empire building, for erecting factory building for manufacture of steam specialties such as Cromwell vacuum heating systems, temperature controls, fans and air washers.

SPOKANE.—The greater part of the plant of the Dean Lumber & Fuel Co. has been destroyed by fire with a loss of $150,000.

SPOKANE.—The Copper Mountain Mining Co. has filed articles of incorporation for $1,000,000. Conrad Wolfe, F. R. Wolfe and other incorporators.

SPOKANE.—Articles of incorporation have been filed by the Silver Queen Mining Co. with a capitalization of $1,500,000, by E. H. Winslow and A. A. Mitchell.

TACOMA.—The state hotel inspector has ordered new fire escapes on twelve hotels in the city. Others are being inspected. An inspection will be made of the hotels of the entire state.

TACOMA.—Work has begun on rebuilding the burned factory of the North Western Wooden Ware Co. at Twentieth and Dock street, which recently was destroyed. New factory will cost $100,000. Complete new equipment is being purchased.

WEST VIRGINIA

PARKERSBURG.—The B. & O. railroad is planning to build a new freight station here, this being included in improvements which will cost $500,000 when completed.

WHEELING.—The Wheeling Steel Casting Co. advises its new plant is being erected at Warwood, a suburb of Wheeling, and not at Kenova, W. Va., as has been stated.

WISCONSIN

GREEN BAY.—The Warwick, Van de Sande & Nelson Co. has been organized here to do a general construction business; $25,000; by Gustus Warwick, Christ Van de Sande and Hans Nelson.

MILWAUKEE.—The Lakeside Bridge & Steel Co., Milwaukee, was awarded the contract for all-steel tainter gates and appurtenances for the new work on the mammoth dam of the Wiscinsin River Power Co., at Prairie du Sac, Wis.

MILWAUKEE.—The American Brass Foundry Co., 198-202 Milwaukee street, has increased its capital from $5,000 to $12,000. The additional issue will be used for handling increased production and new business. No additions or extensions beyond the purchase of some small equipment are contemplated.

MILWAUKEE.—Following the refusal of T. M. E. R. & L. Co. to extend its Wauwatosa interurban line about two miles westward, the Milwaukee county board of supervisors has practically determined to build the line. Engineers of the state highway and railway commissions are preparing estimates on trackage, poles, wires, etc. O. S. Schwemer is chairman of the board.

MILWAUKEE.—The American Construction Co., Milwaukee, is the lowest bidder for the construction complete of the new Milwaukee County Tuberculosis Sanatorium, at $396,600, and the bid has been recommended for acceptance. The estimate for light, heat and power plant and other machinery is $75,000. Robt. Messmer & Bro., Majestic building, Milwaukee, are architects.

MT. HOREB.—The Railway commission has ordered the Chicago & Northwestern R. R. Co. to build an overhead crossing or trestle over its main line tracks here, within four months' time.

OCONOMOWOC.—The Chain Belt Co., Milwaukee, was awarded the contract for furnishing and installing a new coal unloading system at the municipal electric light and power plant here.

OOSTBURG.—The Yale Muffler Co. is the style adopted by F. A. Tuschen, of Milwaukee, and Andrew S. Scheuerell, Sun Prairie, for the operation of the automobile parts and accessory plant purchased by them at bankruptcy sale for $18,000. The plant was owned by the defunct Yale Mfg. Co.

OSHKOSH.—The Mathison Boat Co. sustained a loss of $10,000 to $15,000 on its plant due to fire Sept. 5. The burned portion will be rebuilt at once and re-equipped for the construction of steel and wooden power boats, fishing tugs, etc.

RACINE.—It is reported that the Hamilton-Beach Mfg. Co., electrical appliances and devices, is preparing to move from Racine and locate in an eastern city. The concern passed out of the control of local capital about ten months ago. It is capitalized at $50,000.

SHEBOYGAN.—Silas B. Crocker, founder of the Crocker Chair Co., one of the largest concerns of its kind in the middle west, and who recently retired, has organized the Badger Chair Co., capital $25,000, to establish and operate a chair factory at Sheboygan. The company expects to erect a large building and will require a long list of wood-working machinery.

SUPERIOR.—The Superior Water, Light & Power Co. has awarded a contract to the Westinghouse Electric & Mfg. Co. for a modern steam turbo-generator, with appurtenances and accessories, costing about $40,000. The new equipment will be installed in the electric power station at Second street and John avenue. J. L. Lounsbury is superintendent.

DOMINION OF CANADA

ALBERTA

CALGARY.—Work on the Dominion Western railway, which will run from the International boundary line into the Crow's Nest country, tapping the coal fields of the Calgary district, will be commenced immediately.

CALGARY.—If Calgary ratepayers carry the by-laws which they will vote on Sept. 27, it will mean an expenditure of $2,333,440 as follows: Fire department equipment, $52,000; parks and cemeteries, $45,100; industrial building, $250,000; high level concrete bridge across Bow river, $468,900; concrete bridge across Bow river at Ninth street, $173,000; concrete bridge at Fourth street, $319,350; steel bridge at Fifteenth street, $82,100; concrete bridge across Elbow river, $82,500, and concrete bridge across Bow river at Fourteenth street, $173,000.

MEDICINE HAT.—The Gilbert Hunt Co., Walla Walla, Wash., has arranged to locate a plant in this city for the manufacture of threshing machines, roller feed mills and farm machinery. Gilbert Hunt is head of the firm.

BRITISH COLUMBIA

VICTORIA.—Canadian Pacific railway locomotives on the Cascade subdivision of the road will be transformed into oil burners by the end of October. Oil tanks are being established at different division points to supply fuel.

VICTORIA. — Nettleton-Bruce-Eshbach Co., Seattle railroad contractors, has been awarded a contract for building 20 miles of new road for the Canadian Northern, out of this place, at approximately $225,000.

VICTORIA.—Albert Kelley, of Seattle, has been awarded contract by the Pelton Water Wheel Co. for two miles of welded steel pressure pipe from 48 to 54 inches in diameter, for the hydro-electric plant at the Jordan river.

MANITOBA

SOURIS.—The town council will call immediately for tenders for equipment of electric light plant.

WINNIPEG.—Tenders will be received until Sept. 19 for supplying cast iron water pipe

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THE IRON TRADE REVIEW

CLEVELAND - OHIO

and hydrants. Plans and specifications may be received from A. Peterson, secretary of the board of control.

WINNIPEG.—The Canadian Westinghouse Co. has been awarded contract by board of control for supply of three generators for municipal power house at Point du Bois, at $103,800.

WINNIPEG.—The city council has passed a by-law appropriating $13,000,000 for constructing a water system to be supplied by Shoal lake, subject to a vote of the citizens on Oct. 1.

ONTARIO

DUNNVILLE.—Canadian Engines, Ltd., has decided to build an extension to its plant, 40 x 100 feet. This is the result of a contract made with the Cockshutt Plow Co., of Brantford, for double the output of the present plant.

HAMILTON.—A bridge to cost $100,000 is being planned by the McKittrick syndicate to be built to connect the southwestern portion of the city with the real estate owned by the syndicate.

HAMILTON.—Kent, Garwin & Co., Ltd., has been incorporated with $100,000 capital to manufacture hardware, tools and builders' supplies by Henry A. Burbidge, Percy J. Knox, Arthur H. Robertson.

MEAFORD.—Tenders will be received until Sept. 29 for the construction of an extension and repairs to the revetment wall at Meaford. Plans and specifications may be obtained from the Public Works department, Ottawa, R. C. Desrochers, secretary.

OTTAWA.—The Superior Rolling Mills Co., Ltd., has deposited at Ottawa plans and descriptions of its proposed wharf at Fort William, Ont.

OTTAWA.—Contracts for the two interior elevators to be erected by the Canadian government at Saskatoon and Moose Jaw with a capacity of 3,000,000 bushels each, have been awarded to the Barnet-McQueen Co., of Minneapolis, the contract price being slightly under $1,000,000 for each elevator.

OTTAWA.—A large number of important contracts involving the requirements of structural steel and machinery were let last week as follows by the Dominion government: The York Construction Co., of Toronto, was awarded the final contract on the Trent Valley canal at $130,278; the Northern Dredging Co., dredging at Cheticamp, N. S., $15,000; Standard Construction Co., wharf at Hantsport, N. S., $18,685; Quinlan & Robertson, Montreal, rebuilding head of the grand pier, Soulanges canal, $24,283; Hamilton Bridge Co., steel bridge over the Chambly canal, $2,450; Hamilton Bridge Co., double track railway swing bridge over the Welland canal, $65,800.

OWEN SOUND.—The town council has decided to develop power for the town and neighboring towns from Eugenia Falls. An engineer engaged by the town has reported that 1,600 horsepower may be developed in the summer and 4,000 in the winter. Work on this plant will commence immediately.

PORT ARTHUR.—For the operation of its big elevator plant in Port Arthur, the Canadian Northern railway will install electric apparatus, from 1,100 to 1,500 horsepower being needed.

SARNIA.—The Perfection Stove Co., Ltd., has been incorporated to manufacture stoves; $1,000,000; by Richard V. LeSueur and F. Wade.

SAULT STE. MARIE. — The Sault Ste. Marie Dredging & Construction Co. has been awarded the contract for dredging the channel between Goat island and Little Current on Manitoulin island to a depth of 22 feet at $90,000. This will enable the largest freighters on the lakes to dock at Little Current.

ST. CATHARINES.—The city has been advised by the Ontario Hydro-Electric Commission that its hydro-electric power plant will cost $90,000, and a street lighting system $26,000.

TORONTO.—The John A. Hendricks Co., Ltd., has been incorporated to do construction work in iron and steel; $40,000; by Harry Riley and John F. MacGregor.

TORONTO. — Amalgamated Motors, Ltd., has been incorporated to carry on business as machinist, founder and engineer, and to manufacture motors; $1,000,000; by John F. Selby, Wm. H. Smith, Thomas O. Pardoe and others.

TORONTO.—The purchase of four new steamships for the Canadian Pacific railway's ocean service has been announced by Sir Thomas Shaughnessy. Two vessels 500 feet in length, with 64 feet beam and 11,000 tonnage are to be built for the Atlantic service at a cost of $1,500,000 each. For the Pacific coast trade the two steamers to be bought will be 395 feet long, with 54 feet beam and costing $1,000,000 each.

WALLACEBURG.—The consumers' Gas Co., Wallaceburg, Ltd., and the Premier Electric Light & Power Co., Ltd., have been amalgamated under the name of The Wallaceburg Gas Co., capital $200,000.

WELLAND.—Operations will be commenced again on the Dunnville, Wellandport & Beamsville Electric railway, 13 miles of which had been already graded when the work was stopped on account of financial troubles.

WINDSOR.—The Maxwell Motor Co. of Canada, Ltd., has been incorporated to manufacture and deal in automobiles, motors and their equipment; $10,000; by Walter E. Flanders, general manager; Walter M. Antony, controller; Ernest E. von Rosen, auditor, and others, of Detroit.

QUEBEC

MONTREAL.—The Durbin Train Pipe Connector Co., Ltd., has been incorporated to manufacture and deal in mechanical, electric, pneumatic and other train appliances, couplers, etc.; $300,000; by Richmond W. Hart, Armand Chenier, Christy McNaughton and others, of Toronto, Ont.

MONTREAL.—The patents and business of Francis A. Jacobs, the Montreal mechanical engineer who invented the Jacobs shop furnaces and oil-burning equipment, have been sold to the Mechanical Engineering Co., Ltd., of Montreal, agents for the R. D. Wood & Co. of Philadelphia, and the Mesta Machine Co., of Pittsburgh.

TRADE NOTES

CANNONSBURG, PA.—Members of the board of directors of the Cannonsburg Steel & Iron Works were re-elected at the annual meeting early this month. The board elected John F. Budke, president; John M. Watson, vice president; George W. Redburg, secretary, and George McNutt, treasurer.

CLEVELAND.—F. Felkel & Son, architects, whose main office is in Pittsburgh, have opened an office at 404 Marshall building, Superior avenue and Pubilc Square, Cleveland. The concern devotes its efforts to the development of foundries, steel casting plants and machine shops.

DETROIT.—It is announced unofficially that James Couzens, secretary-treasurer of the Ford Motor Co., has advanced to the vice presidency, succeeding John F. Dodge. This follows the announcement that Dodge Brothers, who are large stockholders in the Ford company, are to manufacture a low-priced automobile independently and cease making drop forgings and parts for the Ford company, as stated in THE IRON TRADE REVIEW several weeks ago.

LOUISVILLE, KY.—A meeting was held recently by stockholders of the National Power Co., to discuss plans for erecting a $500,000 plant in this city for the manufacture of power machines. The machines were tested on the Ohio Falls, it is claimed, and the experiments proved successful.

LYNCHBURG, VA.—Stockholders of the Woodstock Iron Co. have elected officers as the first step to reorganize the company, which is in the hands of bondholders. The company has two furnaces at Anniston, Ala., and ore property in Alabama and Georgia. Officers elected are J. B. Carrington, president; A. H. Maury, vice president; M. B. Wilborn, director.

MONTREAL.—Lockwood, Greene & Co., architects and engineers for industrial plants, 60 Federal street, Boston, announce the establishment of a Canadian office under the name of Lockwood, Greene & Co., of Canada, Ltd., with headquarters in the McGill building.

PITTSBURGH.—The Monongahela Casting Co., of which J. D. Rhoads is president, is now known as the Pennsylvania Casting & Machine Co.

PITTSBURGH.—Sales of the assets of the Youngstown Car Mfg. Co., Youngstown, O., will be made and the company dissolved, following giving of default judgment to Senator Geo. T. Oliver, for $53,083 in a friendly suit to bring about this end. The suit for judgment was not contested by stockholders.

SHARON, PA.—The Sharon Steel Hoop Co. is occupying its new office building.

WAUKESHA, WIS. — The Spring City Foundry Co. has amended its articles to the effect of increasing the number of its directors from three to five.